Technical Report 697

Evaluation of a Revised Individual Ready Reserve (IRR) Aviator Training Program: Final Report

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U. S. Army
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The objectives of the first phase of this project were to revise the Individual Ready Reserve (IRR) aviator training program developed by Allnutt and Everhart (1980) and to evaluate the effectiveness of the revised training program in a controlled training environment. The goals sought in revising the academic training were to minimize Instructor Pilot (IP) involvement in academic training and to minimize the amount of on-site training time that IRR aviators must devote to academic training. Accordingly, the academic portion (Continued)

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of the IRR aviator training program was converted to a self-study format. The flight training procedure employed was a self-paced proficiency-progression procedure that enabled IRR aviators to complete flight training in the least amount of time commensurate with safety.

Forty-seven IRR aviators participated in the evaluation of the 19-day training program during the first training year. One-half of the IRR aviators who participated in the first-year evaluation returned 1 year later for a second 19-day, on-site training period. The main objective of the second-year training period was to compile data with which to assess (a) the knowledge and skill decay that occurs during 1 year with no practice, and (b) the training time IRR aviators require to regain the level of knowledge and skill achieved at the end of the first 19-day training period.

The results of this research support three major conclusions. First, IRR aviators are capable of reacquiring the requisite academic knowledge through self-study alone; most IRR aviators are willing to complete a substantial portion of the self-study at home, prior to their arrival at the training site. Second, even IRR aviators who have not flown for many years are able to reacquire flying skills in far less time than is required to acquire such skills originally. Finally, although academic knowledge and flying skills are acquired in less training time the second year than the first, the difference is relatively small; this finding indicates that most of the knowledge and skill decay that is going to occur over an extended period will have occurred by the end of 1 year without training.

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Education and Training

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FOREWORD

The Fort Rucker Field Unit of the Army Research Institute for the Behavioral and Social Sciences (ARI) conducts research and develops products that increase the effectiveness of Army aviator training.

The focus of this research is the retraining of aviators who recently have joined the Army's Individual Ready Reserve (IRR) program. All individuals accepted into the IRR Aviator Training Program formerly served as active-duty aviators, but left active duty and ceased flying before joining the IRR Program. Some IRR aviators left active duty and ceased flying more than a decade before entering the IRR Aviator Training Program. This research was designed primarily to provide answers to highly specific questions about the best methods and resources to use in retraining IRR aviators. However, in addition to addressing purely applied problems, the research findings add substantially to the meager literature on the rate at which complex psychomotor skills decay and are reacquired.

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EVALUATION OF A REVISED INDIVIDUAL READY RESERVE (IRR)
AVIATOR TRAINING PROGRAM: FINAL REPORT

EXECUTIVE SUMMARY

Requirement:

The objectives of the first phase of this report were to revise the IRR aviator training program developed by Allnutt and Everhart (1980) and to evaluate the effectiveness of the revised training program in a controlled training environment. The goals were to minimize Instructor Pilot (IP) involvement in academic training and to minimize the amount of on-site training time that IRR aviators must devote to academic training.

Procedure:

Accordingly, the academic portion of the IRR aviator training program was converted to a self-study format. Self-study academic materials that can be used at home, at the training site, or both were developed. Also, paper-and-pencil tests were developed to assess IRR aviators' knowledge of the academic materials. The flight training procedure employed was a self-paced, proficiency-progression procedure that enabled IRR aviators to complete flight training in the least amount of time commensurate with safety.

Forty-seven IRR aviators participated in the evaluation of the 19-day training program during the first training year. One-half of the IRR aviators who participated in the first-year evaluation returned 1 year later for a second 19-day, on-site training period. The main objective of the second-year training period was to compile data with which to assess (a) the knowledge and skill decay that occurs during 1 year with no practice, and (b) the training time IRR aviators require to regain the level of knowledge and skill achieved at the end of the first 19-day training period.

Findings:

The results of the first-year evaluation clearly show that, almost without exception, IRR aviators can acquire the requisite level of academic knowledge through self-study alone. The amount of on-site time required to successfully complete the self-study academic training was found to vary as a function of (a) the amount of time that has elapsed since the aviator left active duty, and (b) the amount of time the aviator devoted to home-study.

At the outset of this project, there was considerable uncertainty about IRR aviators' willingness to engage in home-study without any tangible inducements for doing so. The combined results of the first and second training years show that a clear majority of the IRR aviators are willing to devote a significant amount of time to home-study. In order to achieve the maximum amount of home-study, it is necessary that the home-study materials be in the

hands of the IRR aviators no less than 1 month prior to their departure for on-site training; less time clearly results in less home-study, but there is no evidence that more time would result in significantly more home-study.

Less time was required to master the academic material the second training year than the first, but the difference in time was found to be relatively small. The statistically significant relationship (positive) between on-site time devoted to academic study and years elapsed since leaving active duty, which was evident in the data for the first training year, was not present the second training year.

The results of the first training year confirm Everhart's and Allnutt's (1981) finding that IRR aviators are able to reacquire flying skills in far less time than is needed to acquire them initially. The amount of time needed to reacquire flying skills was found to be negatively correlated with the years elapsed since the aviator left active duty and positively correlated with the number of flying hours logged while on active duty. However, these relationships were not found to be as strong and operationally significant as had been expected.

As was true for academic training, flying skills were acquired in less time the second year than the first. However, the difference was relatively small, indicating that most of the skill decay that is going to occur will have occurred by the end of one year without practice or training.

Utilization of Findings:

The implications of the research finding for training management and for mobilization planning are discussed and conclusions are presented.

EVALUATION OF A REVISED INDIVIDUAL READY RESERVE (IRR)
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GLOSSARY OF ACRONYMS

AAPART	- Annual Aviator Proficiency and Readiness Test
ACADAY	- Day on which academic training completed
AH	- Attack Helicopter
ARI	- Army Research Institute
ARNG	- Army National Guard
ARPERCEN	- Army Reserve Personnel Center
ATM	- Aircrew Training Manual
CH	- Cargo Helicopter
CPT	- Captain
CW	- Chief Warrant
DCSOPS	- Deputy Chief of Staff for Operations
DD	- Department of Defense
DES	- Directorate for Evaluation and Standardization
FAA	- Federal Aviation Administration
FAC	- Flight Activity Category
FC	- Field Circular
FLTTRAINHRS	- Number of flight hours required to complete Phase I flight training--first training year
FLTTRAIN II	- Number of flight hours required to complete Phase I flight training--second training year
FORSCOM	- Forces Command
IAS	- Indicated Airspeed
IERW	- Initial Entry Rotary Wing
IFR	- Instrument Flight Rules
IMC	- Instrument Meteorological Conditions
IP	- Instructor Pilot
IRR	- Individual Ready Reserve
MAJ	- Major
MILFLTHRS	- Total number of military flight hours
MITAC	- Map Interpretation and Terrain Analysis Course
MOS	- Military Operational Specialty
NA	- Not Applicable
NOE	- Nap of the Earth
NVG	- Night Vision Goggles
OGE	- Out-of-Ground Effect
OH	- Observation Helicopter
POI	- Program of Instruction
PPC	- Performance Planning Card
RCPAC	- Reserve Component Personnel and Administration Center
SD	- Standard Deviation
SFTS	- Synthetic Flight Training Simulator
SIP	- Standardization Instructor Pilot
SME	- Subject Matter Expert
TC	- Training Circular
TEC	- Training Extension Course
TRADOC	- Training and Doctrine Command
UNITSCOMP	- Number of academic units completed during home study
VHIRP	- Vertical Helicopter Instrument Flight Rule Recovery Procedures
VMC	- Visual Meteorological Conditions
VFR	- Visual Flight Rules
YEARSOUT	- Time elapsed since aviator left active duty

SECTION I: INTRODUCTION

This report describes the development and evaluation of a program designed to retrain former active-duty Army rotary-wing aviators who join the U.S. Army Individual Ready Reserve (IRR) Program. The IRR aviator training program described in this report consists of optional home-study and two 19-day on-site training periods, the second conducted exactly one year after the first.

The report is organized into seven sections. The introductory section presents background information and describes the project objectives. The second section contains a detailed description of the training program that was developed and evaluated. The third section describes the methods used to evaluate the training program during the first training year. The fourth section presents the research findings for the first training year. The fifth section describes the method used to evaluate the training program during the second training year. The sixth section presents the research findings for the second training year. The seventh and final section of the report discusses the implications of the research findings for training management and mobilization planning.

THE INDIVIDUAL READY RESERVE (IRR) PROGRAM

The Individual Ready Reserve (IRR) is a program of training and management for U.S. Army soldiers. Personnel entering the Army incur a six-year initial service obligation. Ordinarily, individuals are placed on Active Duty early in the period for the purpose of receiving qualification training in a Military Occupational Specialty (MOS) or specialty code. Once qualified, individuals may either remain on active duty until their entire service obligation has been fulfilled or leave active duty and complete their service obligation through one of three programs: National Guard, Active Reserve, or Individual Ready Reserve.

Once the service obligation has been fulfilled, the individual has the option of remaining in one of the programs. Participation in the National Guard or Active Reserve program requires affiliation with a specific National Guard or Active Reserve unit. As a member of that unit, the individual must participate in monthly drill periods and annual summer (two-week) training with that unit. Each year spent as a member of a unit counts toward fulfillment of the service obligation.

Individuals participating in the IRR program are assigned to the Army Reserve Personnel Center (ARPERCEN), formerly Reserve Component Personnel and Administration Center (RCPAC). Each reservist is assigned a career manager. Throughout the year, the IRR soldiers are required to maintain contact with their career managers (by telephone or through correspondence) and to participate in various training programs offered at times convenient to both the Army and the reservist. The IRR soldier receives points commensurate with the training that is completed during

the year. Participants in the IRR program must accumulate a minimum of 27 points per year in order to fulfill one year of their service obligation.

Army personnel managers are able to maintain significant numbers of "Civilian Soldiers" qualified in critical specialty codes and MOSs through application of the training programs made available to reservists through the IRR program.

Presently, ARPERCEN manages approximately 94,000 officers. More than 6,000 of the IRR officer population are formerly qualified Army rotary-wing aviators. It is this subpopulation--hereafter referred to as IRR aviators--that is the focus of this study.

BACKGROUND

Prior to 1979, several programs to retrain IRR aviators had been enacted, but with less than satisfactory results. Under one such program, 30 IRR aviators were assigned to one of two Active Army (FORSCOM) aviation units for a 19-day training period. Each unit commander was provided with a training program developed by the Directorate for Evaluation and Standardization (DES), Fort Rucker, and a list of training priorities that had been established by the FORSCOM Aviation Officer. The commanders were directed to conduct as much training as possible with their own resources and to provide feedback to the Deputy Chief of Staff for Operations (DCSOPS) regarding the feasibility and acceptability of the program.

This training approach proved to be so resource intensive--requiring a dedicated helicopter and instructor pilot--that it seriously degraded the unit commander's ability to train his own aviators. Moreover, this approach lacked the desired level of standardization.

In early 1979, DCSOPS tasked the Army Research Institute (ARI) Field Unit, Fort Rucker, Alabama, to develop a standardized training program for IRR aviators. The specific tasks that ARI was requested to accomplish are listed below.

- Evaluate the extent to which aviators' flying skills deteriorate during the interval between the departure from active duty and entry into the IRR flying program.
- Determine the amount and nature of training needed to regain flying proficiency.
- Develop a program for accomplishing the retraining in a cost-effective manner.

Army Research Institute personnel began work on the project by conducting a mail survey. The survey was designed to (a) define the training needs of IRR aviators, and (b) identify problems encountered

during previous IRR aviator training programs. The survey was mailed to IRR aviators who had participated in previous IRR aviator training and to active duty personnel who had been directly involved in formulating or administering previous IRR aviator training programs. The survey results were combined with information obtained from Subject-Matter Experts (SMEs) and were used by ARI personnel to develop a standardized program for training IRR aviators in the UH-1 aircraft (Allnutt & Everhart, 1980). The training program consisted of two separate 19-day training phases, designed to be conducted on two consecutive years. Each phase included both flight and academic training. The flying tasks, academic subject areas, and standards for performance were taken from the Army Aircrew Training Manual for the UH-1 helicopter (TC 1-135), as specified for FAC 2[1] aviators. It was assumed that once the IRR aviators had attained the level of proficiency required to complete the standardized training course, maintaining their skills at the desired level would not be excessively resource intensive, and that the unit could assume the annual training responsibility without adversely affecting their routine training.

In the fall of 1979, instructor pilots (IPs) assigned to the Army Research Institute Field Unit at Fort Rucker, Alabama, trained a sample of 17 IRR aviators using Phase I of the preliminary POI. One year later, six of the 17 IRR aviators returned to Fort Rucker for 19 days of Phase II training, using the same Instructor Pilots that administered the Phase I training. The results of this evaluation revealed several ways in which the POI could be improved. These improvements were incorporated into the POI in March 1980 and copies were mailed to active Army aviation units. A questionnaire designed to provide feedback on the POI's effectiveness was mailed along with each POI. Instructor pilots were requested to use the POI, then complete and return the questionnaire to ARI. In addition, face-to-face interviews were conducted with a sample of the IPs and unit commanders who had used the POI to train IRR aviators.

An analysis of the questionnaire and interview data revealed two basic problems associated with the training program. First, an unacceptably large portion of the Phase I time was required to complete academic training, leaving too little time to complete training in the aircraft. The second problem revealed by the questionnaire stemmed directly from the first: because of the substantial academic training

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[1]All duty positions that may be occupied by Army aviators are classified into one of two Flight Activity Categories (FAC). The distinguishing feature is the level of combat flying inherent in that duty position. Duty positions that include combat flying as the primary responsibility are classified as FAC 1. Duty positions that do not include combat flying as the primary responsibility, but to which aviators may be assigned (staff officer, executive officer, etc.), are classified as FAC 2. Aviators assigned to FAC 2 positions have reduced annual training and proficiency maintenance requirements.

requirements and the IRR aviators' unfamiliarity with Army aviation reference material, an excessive amount of unit IP time was required to administer academic training.

PROJECT OBJECTIVES

The objectives of this project were (a) to revise the 1979 version of the IRR aviator training program (UH-1 aircraft) as necessary to eliminate the problems revealed by the questionnaire survey, and (b) to evaluate the effectiveness of the revised training program in a controlled training environment.

The main goals sought in revising the IRR aviator training program were a) to reduce the amount of time that IRR aviators must devote to academic training during the 19-day training period without compromising the successful completion of the pilot flight evaluation, and b) to minimize unit instructor involvement in the academic training.

The evaluation of the revised IRR aviator training program was designed to a) determine the proportion of IRR aviators trained with the revised program who can pass the oral and inflight portions of the pilot's flight evaluation, and b) determine the extent to which the amount of time needed to reacquire the necessary academic knowledge and flight skills can be predicted based on knowledge of aviators' total flight hours and time away from flying.

SECTION II: DESCRIPTION OF TRAINING PROGRAM

This section describes the IRR aviator training program developed[2] and evaluated during this project. The description has been written to provide the reader with a clear understanding of the recommended training procedures and the resources--both personnel and materiel--needed to accomplish the recommended training. Academic training and flight training are described in separate subsections.

Imbedded in the description of the training program are brief comments about the considerations that led to the development of the IRR training program in its present form.

The characteristics of the training program are described in the present tense; the past tense is used in describing the program development activities and considerations.

TRAINING REQUIREMENT

The general training requirement for IRR aviators was established by representatives of the FORSCOM Aviation Training Officer. The intent of the requirement was to ensure that IRR aviators who complete the IRR aviator training program are capable of (a) performing all of the "basic" flying tasks during visual meteorological conditions (VMC), (b) recovering safely in the event of inadvertent exposure to instrument meteorological conditions (IMC), and (c) performing nap-of-the-earth (NOE) navigation and flight during VMC. A group of aviators assigned to the Directorate of Evaluation and Standardization (DES), Fort Rucker, compiled a set of Aircrew Training Manual (ATM) tasks that, if mastered, would ensure that the IRR aviator would possess the requisite skills. The list of ATM tasks is shown in Table 1. The tasks listed in Table 1 include 49 of the 61 FAC 2 tasks that were present in the ATM at the time the IRR aviator training task list was compiled.

None of the 14 Mission Tasks were selected, and only one of the 12 Instrument Flight Tasks was selected. The one Instrument Flight Task selected--"Perform Vertical Helicopter IFR Recovery Procedures" (VHIRP) (ATM Task #4510)--reflects the intent to train IRR aviators to recover from inadvertent exposure to IMC.

The list shown in Table 1 includes nine of the ten Tactical and Special Tasks on which FAC 2 aviators are trained; the task excluded is "Identify U.S./Allied and Threat Weapons and Aircraft" (ATM Task #5025). Task #5011, "Perform FM Radio Homing," was added to the list to make a total of 10 Tactical and Special Tasks.

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[2]It is important to acknowledge that this program is a refinement of the IRR training program developed by Everhart and Allnutt (1981). They must be credited with much of the original thought and development work that resulted in the training program described here.

TABLE 1

ATM TASK LIST COMPILED BY DIRECTORATE OF EVALUATION AND STANDARDIZATION (DES) AVIATORS

TASK CLASS	TASK NUMBER	TASK NAME
FLIGHT PLANNING	1001	PLAN A VFR FLIGHT
	1003	PREPARE DD FORM 366F (WEIGHT AND BALANCE)
	1004	USE PERFORMANCE CHARTS
	1005	PREPARE PERFORMANCE PLANNING CARD (PPC)
BEFORE FLIGHT	1501	PERFORM PREFLIGHT INSPECTIONS
	1502	PERFORM BEFORE-TAKEOFF CHECKS
HOVERING	2001	PERFORM TAKEOFF TO A HOVER
	2002	PERFORM HOVER (POWER) CHECKS
	2003	PERFORM HOVERING TURNS
	2004	PERFORM HOVERING FLIGHT
	2005	PERFORM LANDING FROM A HOVER
TAKEOFF	2501	PERFORM NORMAL TAKEOFF
	2502	PERFORM SIMULATED MAXIMUM PERFORMANCE TAKEOFF
BASIC FLIGHT	3001	PERFORM STRAIGHT-AND-LEVEL FLIGHT
	3002	PERFORM CLIMBS AND DESCENTS
	3003	PERFORM TURNS
	3004	PERFORM DECELERATION/ACCELERATION
	3005	PERFORM TRAFFIC PATTERN FLIGHT
	3006	PERFORM FUEL MANAGEMENT PROCEDURES
APPROACH/LANDING	3501	PERFORM BEFORE-LANDING CHECKS
	3502	PERFORM NORMAL APPROACH
	3504	PERFORM SHALLOW APPROACH
	3505	PERFORM STEEP APPROACH
	3506	PERFORM GO-AROUND
	3509	PERFORM HIGH RECONNAISSANCE
	3510	PERFORM CONFINED AREA OPERATIONS
	3511	PERFORM SLOPE OPERATIONS
	3512	PERFORM PINNACLE/RIDGELINE OPERATIONS
EMERGENCY	4001	PERFORM HOVERING AUTOROTATION
	4002*	PERFORM STANDARD AUTOROTATION
	4003*	PERFORM STANDARD AUTOROTATION WITH A 180-DEGREE TURN
	4004*	PERFORM LOW-LEVEL AUTOROTATION
	4005*	PERFORM SIMULATED HYDRAULIC SYSTEM MALFUNCTION
	4006*	PERFORM SIMULATED ANTITORQUE MALFUNCTION (FIXED PEDAL SETTINGS)
	4007	PERFORM MANUAL THROTTLE OPERATION, EMERGENCY GOVERNOR MODE
	4008	PERFORM SIMULATED ENGINE FAILURE AT ALTITUDE
	4009	PERFORM SIMULATED ENGINE FAILURE FROM HOVER ALTITUDE
	4010	DESCRIBE OR PERFORM EMERGENCY PROCEDURES
INSTRUMENT FLIGHT	4510	PERFORM VERTICAL HELICOPTER IFR RECOVERY PROCEDURES
	5002	PERFORM TERRAIN FLIGHT NAVIGATION
	5003	PERFORM LOW-LEVEL FLIGHT
	5004	PERFORM CONTOUR FLIGHT
	5005	PERFORM NOE FLIGHT
	5006	PERFORM MASKING AND UNMASKING
	5007	PERFORM NOE DECELERATION
	5008	PERFORM HOVER OUT-OF-GROUND EFFECT (OGE) CHECK
	5009	PERFORM TERRAIN FLIGHT TAKEOFF
	5010	PERFORM TERRAIN FLIGHT APPROACH
	5011	PERFORM FM RADIO HOMING
AFTER LANDING	6501	PERFORM AFTER-LANDING TASKS

*Training on these tasks is restricted (see text for details).

The tasks listed in Table 1 dictated the specific requirements for both academic training and flight training. The IRR aviator training program was designed to provide the least amount of academic and flight training that enables IRR aviators to perform these tasks safely and effectively.

Since the task list in Table 1 was first compiled, the Department of the Army (DA) has eliminated one of the tasks from the ATM: "Perform Standard Autorotation With 180-Degree Turn" (ATM Task #4003). Also, iteration requirements for a second task, "Perform Simulated Anti-Torque Malfunction" (ATM Task #4006), have been eliminated from the ATM.

In addition, they placed a one-year moratorium (ATZQ-ES 231330Z, November 83 RR) on training three of the Emergency Tasks listed in both the ATM and Table 1: "Perform Standard Autorotation" (ATM Task #4002), "Perform Low-Level Autorotation" (ATM Task #4004), and "Perform Simulated Hydraulic System Malfunction" (ATM Task #4005). The Emergency Task moratorium prohibits ATM aviators from performing these tasks at any location, and permits them to be trained during initial or advanced qualification at TRADOC training areas or ARNG training areas only. So, in general, IRR aviators should be trained on all tasks listed in Table 1 except those that have been temporarily or permanently prohibited.

ACADEMIC TRAINING

As was stated earlier, the academic training approach employed in the original version of the IRR aviator training program was judged resource intensive by the unit commanders who evaluated it. Their main objection was the requirement to expend 65 hours of IP time administering lectures on academic topics. This allocation of IP resources was considered particularly objectionable when there is a requirement to train only one or a small number of IRR aviators at a given time. Unit commanders also objected to the large proportion of an IRR aviator's on-site training time that was required to be devoted to academic training. In addition to the 65 hours spent attending lectures, students were required to spend a substantial amount of on-site time studying relevant documents. As a consequence, a primary requirement for a more suitable academic training approach is to reduce both the IP time and students' on-site training time that is devoted to academic training.

Four other considerations had a major influence on the design of a new academic training approach. First, the standard for acceptable mastery of academic materials is fixed; this standard is dictated by the requirement to pass the same oral examination that active duty aviators must pass. Hence, it is not acceptable to achieve time savings at the expense of mastery of the academic materials.

A second important consideration is that IRR aviators constitute a highly heterogeneous training population. In addition to differences in

fundamental abilities, which are present in every training population, IRR aviators differ greatly in (a) the amount of time that has lapsed since they left active duty, (b) the type and amount of training they received while on active duty, and (c) the type and amount of flying experience they accumulated while on active duty. To be suitable, an academic training approach must effectively accommodate the widely differing training needs of this heterogeneous training population.

A third consideration is that much of the academic material has changed in the recent past; some materials have been modified and some altogether new materials have been added. As a consequence, it is essential that an academic training approach be adopted that is effective for both initial learning and relearning of academic materials.

The fourth consideration concerns the feasibility of voluntary home-study as a technique for academic training. Home-study is a potentially effective technique for reducing the on-site training time that must be devoted to academic training. However, since ARPERCEN has no authority to require IRR students to spend nonpaid time studying academic materials prior to the onset of the 19-day on-site training period, home-study cannot be made a mandatory requirement.

Training Approach

The above considerations led to the development of an academic training approach that has many of the attributes of an academic training management approach known as the "Personalized System of Instruction" (PSI) (Keller, 1968). The PSI has been the subject of numerous empirical investigations and has been shown consistently to produce significant advantages in student achievement when compared with lecture and discussion methods (e.g., Taveggia, 1976; Johnson & Ruskin, 1977; Kulik, Kulik, & Cohen, 1979). The distinguishing characteristics of the new IRR aviator academic-training approach are as follows.

Voluntary home-study. Prior to their arrival at the training site, IRR aviators are provided materials that enable them to engage in home-study of the full range of academic topics. A cover letter explains that although home-study is voluntary, IRR aviators who accomplish academic study at home will have more on-site time to devote to flight training.

Self-study materials. The approach relies heavily on written materials that aviators can study independently at any suitable location.

Self-paced study. The approach enables an aviator to proceed through the academic materials at a pace commensurate with his ability and his recall of the material being studied.

Mastery-based progression. The approach requires aviators to demonstrate mastery of a block of academic material before proceeding to a new block of material. For this program, mastery is defined as scoring 90% or higher on a paper-and-pencil examination developed for the block of academic material.

Immediate testing/scoring/feedback. The approach provides for immediate testing, scoring, and feedback. Aviators are permitted to take the examination on a block of academic material as soon as they believe they have mastered the material. An examination is scored and feedback on the results is given immediately upon its completion. A single proctor can provide immediate testing, scoring, and feedback for at least 10 IRR aviators without delaying the progress of any aviator.

Remedial lectures and tutorials by IPs. The approach provides for remedial lectures and tutorials by IPs if and when it becomes apparent that an IRR aviator is incapable of acquiring adequate knowledge through self-study alone. It is important to stress that lectures and tutorials are used for remediation rather than as a primary training technique.

Academic Training Topics

The academic-training topics were derived by a team composed of experienced IPs and behavioral scientists experienced in training. The team's objective was to define the academic knowledge that IRR aviators must possess to pass a standard pilot examination[3] and to perform the selected flight tasks (see Table 1) safely and confidently. The topics addressed by the academic instruction are listed in Table 2. The academic training includes a training unit (block of instruction) for each of the 16 training topics. The objectives of each training unit are discussed briefly below. More detailed information about the material covered by each training unit can be found in the study guide, which is discussed later in this section.

Introduction to the UH-1 Operator's Manual. The objective of this training unit is to familiarize IRR aviators with the contents and organization of the UH-1 Operator's Manual (TM 55-1520-210-10).

Introduction to the Utility Helicopter ATM. This training unit was designed to familiarize IRR aviators with the organization and content of the Utility Helicopter ATM (FC 1-211). It was designed principally for IRR aviators who left active duty before ATMs were developed.

Weight and Balance. This unit was designed to teach IRR aviators the fundamental principles of weight and balance and to teach them to complete a Weight and Balance Clearance Form F (DD Form 365F).

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[3]The requirements for the pilot evaluation can be found in Chapter 7 of the Utility Helicopter ATM: FC-1-211 (Department of the Army, 1984).

TABLE 2

ACADEMIC TRAINING TOPICS

TRAINING PHASE	ACADEMIC TOPICS
PHASE I	INTRODUCTION TO THE UH-1 OPERATOR'S MANUAL INTRODUCTION TO THE UH-1 AIRCREW TRAINING MANUAL (ATM) WEIGHT AND BALANCE PERFORMANCE PLANNING CARD NORMAL PROCEDURES OPERATING LIMITS EMERGENCY PROCEDURES BASIC INSTRUMENTS REGULATIONS AND PUBLICATIONS AERODYNAMICS AEROMEDICAL FACTORS NIGHT VISION NIGHT FLIGHT TECHNIQUES
PHASE II	TERRAIN FLIGHT MAP INTERPRETATION AND NAP-OF-THE-EARTH (NOE) NAVIGATION

Performance Planning Card. This unit was designed to teach IRR aviators the principles of performance planning and the procedures for completing a Rotary-Wing Performance Planning Card (DA Form 4887-R). Instruction is provided on the procedures for using charts and a dead-reckoning computer to compute the following values:

- maximum torque available,
- torque available for continuous operation,
- go-no-go torque available,
- predicted hover torque,
- hover out-of-ground-effect,
- maximum allowable gross weight,
- maximum R/C-endurance IAS,
- maximum range IAS,
- safe pedal margin, and
- estimated fuel flow.

Normal Procedures. This unit familiarizes the IRR aviator with the normal procedures necessary to ensure safe and efficient operation of the helicopter from the time the preflight begins until the flight is completed and the helicopter is parked and secured.

Operating Limits and Restrictions. This unit teaches IRR aviators all operating limits and operational restrictions of the UH-1 aircraft.

Emergency Procedures. This unit teaches IRR aviators the appropriate corrective actions that must be implemented by aviators when faced with an emergency situation in the UH-1 aircraft.

Basic Instruments. This unit instructs IRR aviators in the use of instruments to perform basic flight maneuvers: straight-and-level flight, climbs, descents, turns, accelerations, and decelerations. These are the basic skills needed to pilot the aircraft after encountering inadvertent instrument meteorological conditions (IMCs).

Regulations and Publications. This unit aids the IRR aviator in acquiring a working knowledge of the flight regulations and publications that have an important influence on flying and flight safety.

Aerodynamics. This unit provides the IRR aviator with a knowledge of the basic laws of motion and pressure differential that govern the flight of helicopters.

Aeromedical Factors. This unit provides instruction on the effect of the flight environment upon the Army aircrew member's body and on the capabilities and limitations of the human body.

Night Vision. This unit provides instruction on night vision limitations, dark adaptation, night vision techniques, and night visual illusions.

Night Flight Techniques. This unit teaches IRR aviators the special problems that are encountered when flying at night and the proper techniques for coping with these problems.

Terrain Flight. This unit defines the various modes of terrain flight and teaches IRR aviators the fundamental principles of terrain flight operations.

Map Interpretation and NOE Navigation. This unit teaches IRR aviators to interpret standard 1:50,000-scale maps and to use the maps to navigate at NOE altitudes. As is shown in Table 2, terrain flight and map interpretation/NOE navigation are the only academic units provided during Phase II.

Academic Training/Testing Materials

The training materials and tests used to accomplish the academic training are as follows.

Reference materials. Table 3 lists the reference materials required to accomplish the academic training. Each IRR aviator is provided a bound set of these documents, or parts of documents, for use during both home-study and on-site study. The bound volume contains approximately 800 pages of reference material taken from nine DA publications and one Federal Aviation Administration (FAA) publication.

TABLE 3

IRR AVIATOR TRAINING PROGRAM REFERENCE MATERIAL

DOCUMENT IDENTIFIER	TITLE/CHAPTER
FAA AIM	FAA AIRMAN'S INFORMATION MANUAL Chapter 3. Airspace
AR 40-8	TEMPORARY FLYING RESTRICTIONS DUE TO EXOGENOUS FACTORS
AR 95-1	ARMY AVIATION: GENERAL PROVISIONS AND FLIGHT REGULATIONS
AR 95-16	WEIGHT AND BALANCE: ARMY AIRCRAFT
AR 750-31	TECHNICAL PUBLICATIONS FOR AIRCRAFT FILES
FM 1-5	INSTRUMENT FLYING AND NAVIGATION FOR ARMY AVIATORS Chapter 4. Basic Instrument Maneuvers Chapter 12. Dead Reckoning (DR) Computer
FM 1-51	ROTARY WING FLIGHT Chapter 2. Helicopter Aerodynamics Chapter 5. Terrain Flight Chapter 6. Night Vision
FM 21-33	TERRAIN ANALYSIS Chapter 4.
Student Handbook	MAP INTERPRETATION IN NAP-OF-THE-EARTH (NOE) FLIGHT
TC 1-20	AEROMEDICAL TRAINING FOR FLIGHT PERSONNEL Chapter 1. General Rules of Mental and Physical Health Chapter 2. Altitude Physiology Chapter 3. Stress and Fatigue in Flying Operations Chapter 5. Toxic Hazards in Aviation Chapter 7. Noise in Aviation Chapter 9. Disorientation and Illusions of Flight
FC 1-211	AIRCREW TRAINING MANUAL UTILITY HELICOPTER
TM 55-1520-210-10	OPERATORS' MANUAL HELICOPTER, UH-1 H/V Chapter 1. Introduction Chapter 2. Helicopter and Systems Description and Operation Chapter 5. Operating Limits and Restrictions Chapter 6. Weight/Balance and Loading Chapter 7. Performance Data Chapter 8. Normal Procedures Chapter 9. Emergency Procedures

Study guides. The academic materials include a study guide for each of the Phase I academic units--12 study guides in all. Each study guide defines the purpose of the academic unit and identifies the reference materials that are to be studied. In addition, each study guide contains questions and exercises that serve to focus the IRR aviators' attention on key parts of the reference documents. In principle, an IRR aviator who completes and commits to memory every part of every study guide will have sufficient knowledge to pass both the paper-and-pencil exams and the pilot evaluation. The study guides are used during both home-study and on-site study.

Diagnostic examination. The diagnostic examination is a 221-item paper-and-pencil examination designed to test IRR aviators' knowledge of the full range of academic topics. The diagnostic examination was derived from a systematic examination of the reference materials and questions that DES Standardization Instructor Pilots (SIPs) ask during the oral portion of a checkride. A comprehensive listing of knowledge elements was compiled and sorted by topic area, and redundant knowledge elements were eliminated. Each knowledge element remaining on the list was converted to a multiple choice test item using the best known principles of item construction. The test items were reviewed and, when necessary, refined by IPs and by experts in test-item construction. The final result was a paper-and-pencil test containing 221 multiple-choice items.

Academic quizzes. The academic materials include 12 pairs of academic quizzes, one pair for each academic unit. All quiz items are multiple choice. The length of the quizzes varies from six to 29 items. The quizzes are designed to evaluate the aviators' understanding of the knowledge elements that are highlighted by the exercises and questions in the corresponding study guide. The pairs of quizzes are parallel forms. The two parallel forms contain the same number of items, and test precisely the same knowledge elements. Although the psychometric characteristics of the quizzes have not been evaluated empirically, each item has been evaluated by a team consisting of experienced IPs and experts in test design.

Academic Training Procedure

The academic training procedure is illustrated schematically by the flow diagram in Figure 1. The procedure commences at the time the IRR aviator receives the academic study material (references and study guides) through the mail--about four weeks prior to departing for on-site training.[4]

[4] Interviews indicate that IRR aviators seldom commence home-study earlier than about one month prior to their departure for on-site training. Interviews also indicate that most IRR aviators have insufficient spare time to complete home-study if the academic materials are received less than one month before departure for on-site training.

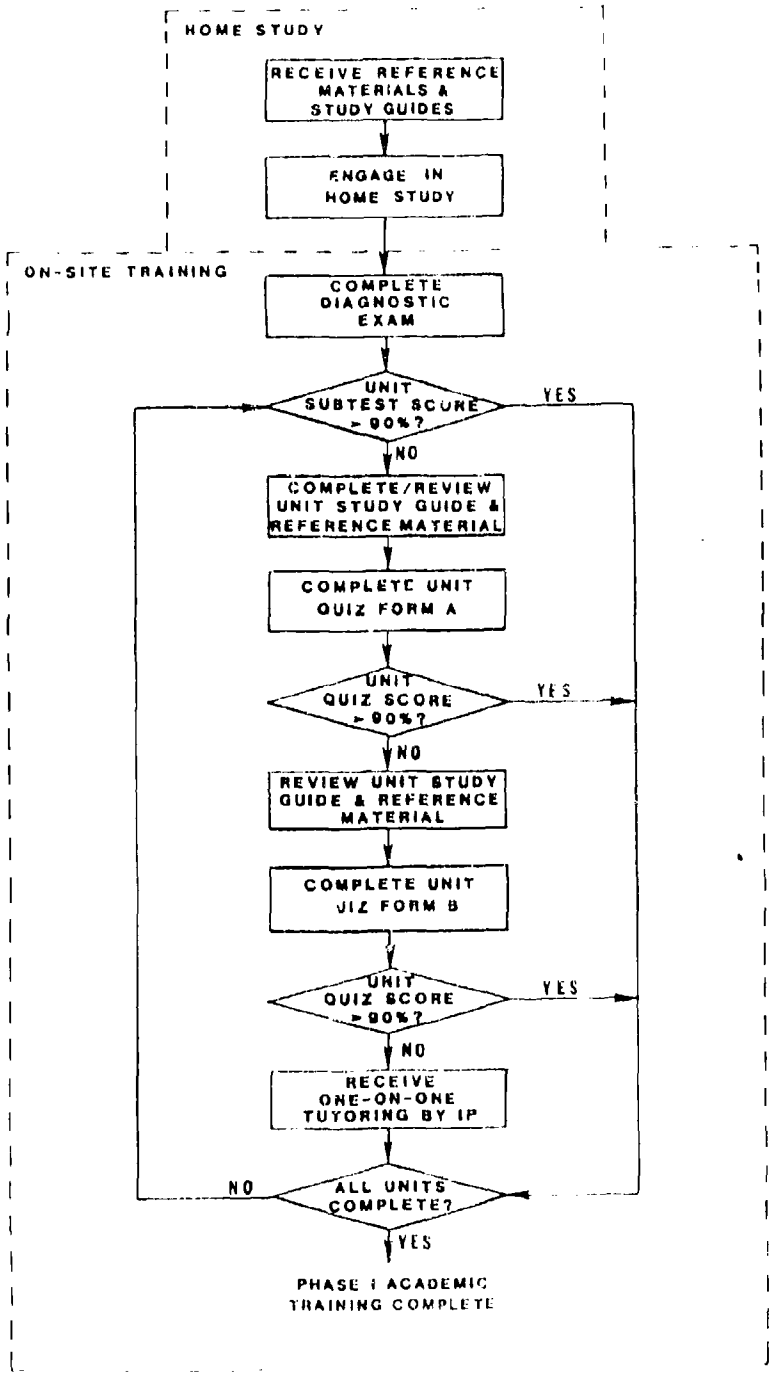

Figure 1. Flow-diagram illustrating the academic training procedures.

Upon arrival at the training site, each IRR aviator is required to complete the diagnostic examination discussed earlier. The diagnostic examination is administered as soon as possible after the IRR aviator arrives at the training site--usually on the afternoon of the first day or the morning of the second. The IRR aviator need only complete in-processing before taking the diagnostic examination. The diagnostic examination is scored immediately and the IRR aviator is informed of the subtests on which his test score is less than 90% correct. On-site academic study is required for all units on which the diagnostic subtest score is less than 90%.

On-site study of the academic units is completed one unit at a time, in the order shown in Table 2. Academic study of the unit consists of reading the reference material and completing the questions and exercises in the study guide for the unit being studied. Form A of the unit quiz is administered as soon as the IRR aviator has read the reference material and completed the study guide. The IRR aviator is given as much time as is needed to complete the unit quiz. The quiz is scored immediately by a proctor, and the IRR aviator is informed of his score.

Aviators who score 90% or higher on the unit quiz are instructed to begin study of the next academic unit in the series. Aviators who score less than 90% on the unit quiz are informed of the questions answered incorrectly and are instructed to review the parts of the reference materials and the parts of the completed study guide that pertain to the items answered incorrectly. Form B of the unit quiz is administered as soon as the IRR aviator completes the review. Aviators who score 90% or higher on Form B of the unit quiz are instructed to proceed to the next academic unit in the sequence. Aviators who score less than 90% on Form B of the unit quiz are provided with individual tutoring by an IP. Once the IP is satisfied that the IRR aviator has sufficient knowledge of the material, the IP "signs off" on the unit and the IRR aviator proceeds to the next academic unit in the sequence.

The procedure described above is repeated until the IRR aviator has completed all the academic units not exempted by 90% performance on the corresponding subtests of the diagnostic examination.

FLIGHT TRAINING

Table 4 lists the ATM tasks on which IRR aviators are trained during Phase I and Phase II flight training. The rationale underlying the selection of these tasks was discussed at the beginning of this section (see pp. 8 - 10). Except for being organized by training phase, the tasks listed in Table 4 are the same as those listed in Table 1.

The main objective of Phase I flight training is to requalify IRR aviators in basic helicopter flight under VMC. Some training on instrument flight (ATM Task #4510) is required, but only to the extent

TABLE 4

FLIGHT TASKS TAUGHT IN IRR AVIATOR TRAINING PROGRAM

TASK NUMBER	TASK NAME
	PHASE I
1001	PLAN A VFR FLIGHT
1003	PREPARE DD FORM 366F (WEIGHT AND BALANCE)
1004	USE PERFORMANCE CHARTS
1005	PREPARE PERFORMANCE PLANNING CARD (PPC)
1501	PERFORM PREFLIGHT INSPECTION
1502	PERFORM BEFORE-TAKEOFF CHECKS
2001	PERFORM TAKEOFF TO A HOVER
2002	PERFORM HOVER (POWER) CHECKS
2003	PERFORM HOVERING TURNS
2004	PERFORM HOVERING FLIGHT
2005	PERFORM LANDING FROM A HOVER
2501	PERFORM NORMAL TAKEOFF
2502	PERFORM SIMULATED MAXIMUM PERFORMANCE TAKEOFF
3001	PERFORM STRAIGHT-AND-LEVEL FLIGHT
3002	PERFORM CLIMBS AND DESCENTS
3003	PERFORM TURNS
3004	PERFORM DECELERATION/ACCELERATION
3005	PERFORM TRAFFIC PATTERN FLIGHT
3006	PERFORM FUEL MANAGEMENT PROCEDURES
3501	PERFORM BEFORE-LANDING CHECKS
3502	PERFORM NORMAL APPROACH
3504	PERFORM SHALLOW APPROACH
3505	PERFORM STEEP APPROACH
3506	PERFORM GO-AROUND
3509	PERFORM HIGH RECONNAISSANCE
3510	PERFORM CONFINED AREA OPERATIONS
3511	PERFORM SLOPE OPERATIONS
3512	PERFORM PINNACLE/RIDGELINE OPERATIONS
4001	*PERFORM HOVERING AUTOROTATION
4002	*PERFORM STANDARD AUTOROTATION
4003	*PERFORM STANDARD AUTOROTATION WITH A 180-DEGREE TURN
4004	*PERFORM LOW-LEVEL AUTOROTATION
4005	*PERFORM SIMULATED HYDRAULIC SYSTEM MALFUNCTION
4006	*PERFORM SIMULATED ANTITORQUE MALFUNCTION (FIXED PEDAL SETTINGS)
4007	PERFORM MANUAL THROTTLE OPERATION, EMERGENCY GOVERNOR MODE
4008	PERFORM SIMULATED ENGINE FAILURE AT ALTITUDE
4009	PERFORM SIMULATED ENGINE FAILURE FROM HOVER ALTITUDE
4010	DESCRIBE OR PERFORM EMERGENCY PROCEDURES
4510	PERFORM VERTICAL HELICOPTER IFR RECOVERY PROCEDURES
6501	PERFORM AFTER-LANDING TASKS
	PHASE II
5002	PERFORM TERRAIN FLIGHT NAVIGATION
5003	PERFORM LOW-LEVEL FLIGHT
5004	PERFORM CONTOUR FLIGHT
5005	PERFORM NOE FLIGHT
5006	PERFORM MASKING AND UNMASKING
5007	PERFORM NOE DECELERATION
5008	PERFORM HOVER OUT-OF-GROUND EFFECT (OGE) CHECK
5009	PERFORM TERRAIN FLIGHT TAKEOFF
5010	PERFORM TERRAIN FLIGHT APPROACH
5011	PERFORM FM RADIO HOMING

*Training on these tasks is restricted (see pp. 5-7).

necessary to enable an IRR aviator to recover safely in the event of inadvertent exposure to IMC. It is important to note that the intent is not to qualify IRR aviators as instrument pilots.

Most of Phase I flight training can be conducted either in a stagefield traffic pattern or enroute between a heliport and a stagefield. The only landings that must be practiced at locations other than a stagefield are confined-area landings and pinnacle landings.

The objective of Phase II flight training is to train IRR aviators in selected tactical/special mission tasks. The ten tactical/special mission tasks are listed at the bottom of Table 4. Training on most Phase II tasks must be conducted in a tactical flight-training area.

Because IRR aviators' training needs vary so widely, it is not possible to develop a fixed training procedure and schedule that is suitable for all IRR aviators. Rather, a procedure is required that enables the IP to make an initial evaluation of the IRR aviators' flight skills and to tailor a training program to the individual IRR aviators' skill deficiencies. Accordingly, the recommended flight training procedure is a self-paced, proficiency-progression procedure that enables IRR aviators to complete Phase I and Phase II flight training and to begin mission training in the shortest period of time that their skills will allow. The training procedure is illustrated schematically by the flow diagram in Figure 2.

Proficiency Flight Evaluation

As is shown in Figure 2, both Phase I and Phase II flight training commence with a proficiency flight evaluation. The proficiency flight evaluation should be conducted by the IP who has been assigned responsibility for training the IRR aviator being evaluated. The purpose of the proficiency flight evaluation is to assess the IRR aviator's proficiency on the appropriate set of flying tasks--Phase I or Phase II. IRR aviators found to be proficient on all Phase I tasks proceed directly to a Phase II proficiency evaluation and Phase II training; others must complete Phase I training before proceeding to Phase II.

Training on Phase I/Phase II Flying Tasks

The proficiency flight evaluation serves to identify the flying tasks on which an IRR aviator lacks adequate proficiency. The IP to whom an IRR aviator has been assigned has full responsibility for developing a flight training program that is tailored to the IRR aviator's individual skill deficiencies. Since the rate at which flying skills are reacquired varies greatly from one IRR aviator to another, it

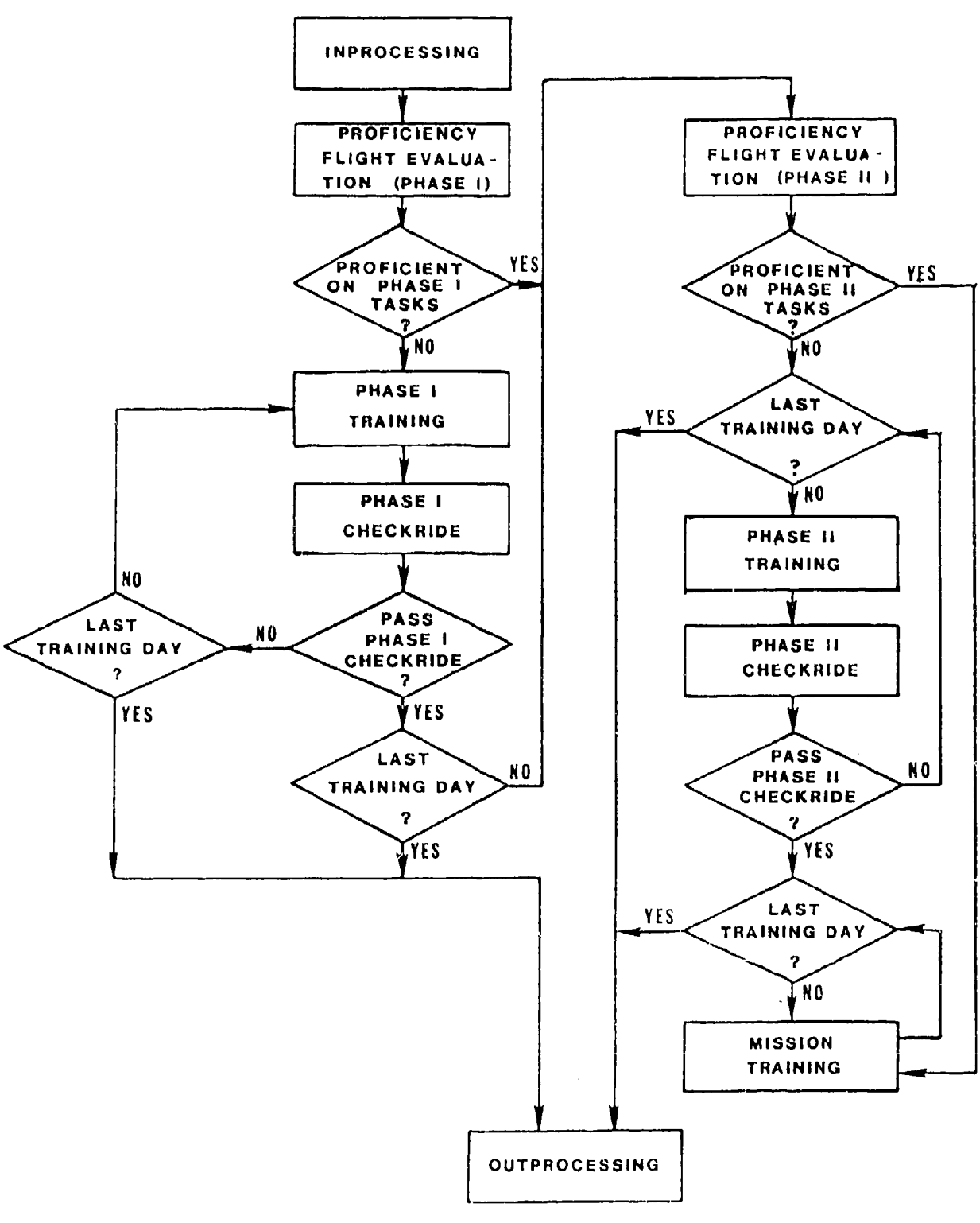

Figure 2. Flow-diagram illustrating the flight-training procedures.

is essential that the IP continuously adjust the training program as necessary to expend training time only on the flying tasks for which the IRR aviator has not yet gained proficiency. However, it is essential that IPs "spot check" tasks on which the IRR aviator has previously demonstrated proficiency to insure that the aviator's proficiency remains at an acceptably high level throughout training. Flight training should continue until the IRR aviator is capable of performing all Phase I or Phase II tasks to the standards set forth in the UH-1 ATM (FC 1-211).

The IP who administers the training is responsible for judging when the IRR aviator is proficient enough to be given a checkride.

The IP should design the program to take full advantage of available training devices. For instance, the 2C35 UH-1 Cockpit Procedural Trainer can be used to augment aircraft training on cockpit procedures, engine starting/run-up procedures, shutdown procedures, and selected emergency procedures without expending flying hours. Similarly, the 2B24 UH-1 Flight Simulator can be used for basic instruments and selected emergency procedures.

Phase I/II Checkrides

The checkride is administered as soon as the IP judges that the IRR aviator is capable of performing all tasks for the appropriate training phase to ATM standards. The checkride should be administered by an IP other than the one who is responsible for training the IRR aviator. The evaluation methods and standards should be the same as those used to evaluate active duty aviators (FC 1-211, Chapter 7).

IRR aviators who fail to pass the checkride should receive additional training on the tasks that were not performed adequately during the checkride. The training and checkrides continue until the IRR aviator passes the checkride or until the 19-day training period has ended. IRR aviators who pass the Phase I checkride proceed to Phase II training if there is sufficient time left in the 19-day training period. IRR aviators who pass the Phase II checkride proceed to mission training if there is sufficient time left in the 19-day training period.

The IP who administers the Phase I checkride should be instructed to exclude oral examination questions about ATM tasks on which IRR aviators receive no training. Specifically, IPs should ask no questions about the following:

- interpretation of performance and navigation charts (maps),
- tactical instrument flight planning,
- terrain flight planning,
- NVG description,
- NVG operations,
- NVG limitations,

- aircrew NVG requirements, and
- NVG failure.

Otherwise, the Phase I checkride should adhere to the methods and standards set forth in the UH-1 ATM (FC 1-211).

The Phase II checkride, covering only Phase II tasks, need not include an oral examination. However, the IP should evaluate the IRR aviator's ability to prepare a terrain flight briefing in accordance with TC 1-24.

Mission Training

After completing Phase I and Phase II of the standardized training program, the IRR aviators' aviation knowledge and flight proficiency should be at a level that will allow them to begin mission training, in accordance with TC 1-134, p. 2-12. To this end, it is important for the commander to have considered the reservists' role in accomplishing the unit mission and to have formulated a task list for the reservists in the same manner he would have for a newly assigned active duty aviator (TC 1-134, p. 2-4). Future training sessions should be directed toward qualifying reservists in the tasks appearing on their individual task lists and completing Annual Aviator Proficiency and Readiness Test (AAPART) requirements deemed appropriate.

SECTION III: RESEARCH METHOD--FIRST TRAINING YEAR

The method discussed below addresses the first year of the two-year evaluation; the method used during the second year is described in Section VI. The entire evaluation was conducted at the United States Army Aviation Center, Fort Rucker, Alabama.

SUBJECTS

Forty-seven male IRR aviators served as subjects for the evaluation. The IRR aviators were selected by Army Reserve Personnel Center (ARPERCEN) personnel from the pool of IRR aviators available at the start of each training session. The military rank of the IRR aviators is shown in Table 5.

TABLE 5

RANK OF IRR AVIATORS WHO SERVED AS SUBJECTS: FIRST TRAINING YEAR

RANK	NO. OF AVIATORS
CPT	10
CW4	1
CW3	12
CW2	24

The time that had elapsed since the IRR aviator left active duty ranged from one year to 19 years; the median time was 7.5 years. Thirteen of the IRR aviators had previously participated in some type of IRR training program.

The total hours that the IRR aviators had logged prior to their participation in this evaluation ranged from 235 hours to 4,300 hours; the median number of total flight hours logged was 1,260. Table 6 shows (a) the types of aircraft in which the IRR aviators had logged time, and (b) the median and number range of hours logged in each type aircraft. All IRR aviators in the sample had been qualified in the UH-1 aircraft. Thirty-two of the IRR aviators had been qualified in one or more additional aircraft. (For the most part, the "other" aircraft are rotary wing that are no longer in the Army inventory.)

Twenty-nine of the 47 IRR aviators had been qualified in instrument flight at some time during their career as active duty Army aviators.

TABLE 6

FLIGHT EXPERIENCE OF IRR AVIATORS

AIRCRAFT TYPE	NUMBER OF IRR AVIATORS	MEDIAN FLIGHT HOURS	RANGE OF FLIGHT HOURS
UH-1	47	700	50-2300
AH-1	12	205	30-2600
OH-58	18	298	10-1500
CH-47	2	640	300-1000
OTHER	24	300	30-1300

INSTRUCTOR PILOTS

All flight training during the evaluation was conducted by four highly experienced IPs. Two IPs were active duty Army IPs, one IP was a Department of the Army civilian, and the fourth IP was a civilian contract IP. All were qualified as IP in the UH-1 aircraft.

TRAINING-CLASS SCHEDULE

The training-class schedule is shown in Table 7. One training class was conducted each month from June 1982 through November 1982. The class size ranged from six to 10 IRR aviators.

TABLE 7

NUMBER OF IRR AVIATORS TRAINED EACH MONTH:
FIRST TRAINING YEAR

MONTH	DATES	NO. OF AVIATORS
JUNE	1-19	10
JULY	6-24	6
AUGUST	2-20	8
SEPTEMBER	7-25	7
OCTOBER	4-22	8
NOVEMBER	1-19	8

GENERAL TRAINING SCHEDULE

Although self-paced proficiency progression training was employed throughout, it was necessary to develop a general training schedule that set aside prescribed times for training activities and administrative tasks. The general training schedule is shown in Table 8. It can be

TABLE 8

GENERAL TRAINING SCHEDULE FOR IRR AVIATOR TRAINING

TRAINING DAY	TIME	ACTIVITY
1	0730-1115	INPROCESSING
	1200-1500	DIAGNOSTIC EXAMINATION
	1500-1615	ORAL EXAMINATIONS
2	0600-1130	PROFICIENCY FLIGHT EVALUATION
	1230-1600	INPROCESSING
	1600-1900	COCKPIT PROCEDURES TRAINING (2C35)
	1900-	STUDY AS NEEDED
3	0900-1130	ACADEMIC STUDY
	1230-1800	FLIGHT TRAINING
	1900-2200	SFTS TRAINING (2B24 FLIGHT SIMULATOR)
4	0900-1130	ACADEMIC STUDY
	1230-1800	FLIGHT TRAINING
	1800-	STUDY AS NEEDED
5	0800-1130	ACADEMIC STUDY
	1230-1800	FLIGHT TRAINING
	1800-	STUDY AS NEEDED
6	0845-1145	SFTS TRAINING (2B24 FLIGHT SIMULATOR)
	1245-1645	OPTIONAL FLIGHT TRAINING
7	0800-1700	OPTIONAL FLIGHT TRAINING
	1700-	STUDY AS NEEDED
8	0800-1130	ACADEMIC STUDY
	1230-1800	FLIGHT TRAINING
	1800-	STUDY AS NEEDED
9	0800-1130	ACADEMIC STUDY
	1230-1800	FLIGHT TRAINING
	1800-	STUDY AS NEEDED

TRAINING DAY	TIME	ACTIVITY
10	0800-1130	ACADEMIC STUDY
	1230-1800	FLIGHT TRAINING
	1800-	STUDY AS NEEDED
11	0800-1130	ACADEMIC STUDY
	1230-1800	FLIGHT TRAINING
	1800-	STUDY AS NEEDED
12	0800-1130	ACADEMIC STUDY
	1230-1800	FLIGHT TRAINING
	1800-	STUDY AS NEEDED
13	0800-1700	OPTIONAL FLIGHT TRAINING
	1700-	STUDY AS NEEDED
14	0800-1700	OPTIONAL FLIGHT TRAINING
	1700-	STUDY AS NEEDED
15	0800-1130	ACADEMIC STUDY
	1230-1800	FLIGHT TRAINING
	1800-	STUDY AS NEEDED
16	0800-1130	ACADEMIC STUDY
	1230-1800	FLIGHT TRAINING
	1800-	STUDY AS NEEDED
17	0800-1130	ACADEMIC STUDY
	1230-1800	FLIGHT TRAINING
	1800-	STUDY AS NEEDED
18	1200-1500	ACADEMIC POSTTEST
	1500-2000	NIGHT FLIGHT TRAINING
19	0800-0900	OUTPROCESSING
	0900-1100	OUT-BRIEF WITH PROJECT PERSONNEL
	1100-	OUTPROCESSING

seen that about two days of each 19-day training period were required for inprocessing and outprocessing. The remaining 17 days were used for testing, academic study, and flight training. As would be expected, modification of the general schedule was necessitated by inclement weather, holidays, nonavailability of aircraft, IP/student illness, and rate of skill acquisition by IRR aviators.

"Optional flight training" periods were scheduled for days 6, 7, 13, and 14. In some instances, the optional flight training periods were used to make up for flying days lost because of holidays, inclement weather, or aircraft scheduling problems. However, the primary purpose of the optional flight training periods was to provide an incentive for completing academic training as quickly as possible. Aviators' daily academic progress was graphically plotted in the manner shown in Appendix A. Aviators who were ahead of the minimum rate of progress required to complete the academic program in 19 days were permitted to use the optional flight training periods to obtain additional flight training. Aviators whose progress in the academic program was not ahead of the minimum acceptable rate of progress were required to attend a proctored study period.

ACADEMIC TOPICS

Phase I

During the first training year, aviators received instruction in 12 of the 15 academic topics described in Section II. These topics are listed in Table 9 in the order in which the aviators received the

TABLE 9

ACADEMIC TRAINING TOPICS: FIRST TRAINING YEAR

TRAINING PHASE	ACADEMIC TOPICS
PHASE I	INTRODUCTION TO THE UH-1 OPERATOR'S MANUAL INTRODUCTION TO THE UH-1 AIRCREW TRAINING MANUAL NORMAL PROCEDURES OPERATING LIMITS EMERGENCY PROCEDURES BASIC INSTRUMENTS REGULATIONS AND PUBLICATIONS AERODYNAMICS AEROMEDICAL FACTORS TERRAIN FLIGHT NIGHT VISION NIGHT FLIGHT TECHNIQUES
PHASE II	MAP INTERPRETATION AND NAP-OF-THE-EARTH (NOE) NAVIGATION

instruction. It should be noted here that three additional topics, shown in Table 2, Section II, were added to the training program to meet academic needs identified during the first training year. Similarly, the order in which the academic courses were trained was revised after the first training year to better integrate academic and flight training. This accounts for the differences between Table 2 and Table 9.

Phase II

All Phase II academic instruction was provided by a Training Extension Course (TEC) entitled "Map Interpretation and Terrain Analysis Course" (MITAC). This course, designed for administration on the Bessler Cue/See[5] device is currently used by both active and reserve aviation units. The TEC version of MITAC consists of (a) a set of illustrated lectures that employ 8-mm still frames and recorded commentaries to describe and illustrate the rules and practices cartographers follow in selecting and portraying topographic features on 1:50,000-scale topographic maps, and (b) a set of navigational exercises that provide instruction on NOE navigation. The MITAC lessons are listed in Table 10.

TABLE 10

LISTING OF MITAC LESSONS

LESSON NUMBER	LESSON TITLE
1	INTRODUCTION TO MITAC
2	MAP INTERPRETATION
3	CONTOUR INTERPRETATION
4	TERRAIN ANALYSIS
5	ADVANCED TERRAIN ANALYSIS
6	ALONG-TRACK ORIENTATION
7	ADVANCED ALONG-TRACK ORIENTATION
8	CROSS-TRACK ORIENTATION
9	ADVANCED CROSS-TRACK ORIENTATION
10	CORRIDOR ORIENTATION I
11	CORRIDOR ORIENTATION II
12	CORRIDOR ORIENTATION III
13	CORRIDOR ORIENTATION IV

[5]The Bessler Cue/See device permits a rear projected 8-mm training film to be synchronized with a voice commentary recorded on an audio cassette.

FLIGHT TASKS

The flight tasks on which the IRR aviators were trained are the same as those listed in Table 4. The training was conducted prior to the moratorium on selected emergency tasks, so Phase I training did include: hovering autorotation, standard autorotation, low-level autorotation, simulated hydraulic system malfunction, and simulated antitorque malfunction. As is discussed in more detail later, all IRR aviators completed training on both Phase I tasks and Phase II tasks.

One additional task--perform radio procedures--was trained and evaluated during Phase I flight training. Each IRR aviator was taught to use correct syntax for all takeoff, landing, and enroute requests under VMC. Although perform radio procedures is not among the tasks specified in the UH-1 ATM, a knowledge of radio procedures must be demonstrated in order to pass a checkride.

During the first training year, the task "Perform Standard Autorotation With a 180-Degree Turn" was eliminated from the ATM. Aviators in the June and July classes received instruction on this task; however, after July, no aviator received instruction on this task.

FLIGHT TRAINING DEVICES

Training in the UH-1 aircraft was augmented with training in the 2C35 UH-1 Cockpit Procedures Trainer and in the 2B24 UH-1 flight simulator. As is shown in Table 9, IRR aviators were scheduled to receive one three-hour block of instruction in the 2C35 and two three-hour blocks of instruction in the 2B24. The 2C35 was used to provide instruction on cockpit procedures, engine starting/run-up procedures, shutdown procedures. and selected emergency procedures. The 2B24 was used to provide instruction on selected emergency procedures and basic instruments. Due to scheduling difficulties,[6] 10 IRR aviators received only one three-hour block of instruction in the 2B24.

TRAINING PROCEDURES

With only a few exceptions, the training procedures used in this evaluation are the same as those described in Section II.

Mail Reference Materials and Study Guides

The original intent was to schedule the mailing of the academic materials (reference and study guides) so that IRR aviators would

[6]In the event of scheduling conflicts, priority in the use of Fort Rucker training devices is given to Initial Entry Rotary Wing (IERW) student training.

receive them at least two weeks[7] before departing for on-site training. Twenty-three of the 47 aviators were assigned to the program at such a late date that it was not possible to mail them the academic materials prior to their departure for the training site. The remaining 24 IRR aviators received the academic materials in the mail no less than one week and no more than three weeks prior to the date they departed for on-site training.

Academic Training Procedure

The academic materials, training procedures, and testing procedures used in the first-year evaluation were the same as those described in Section II. In brief, IRR aviators began academic training by engaging in voluntary home-study. Home-study consisted of (a) reading reference documents, and (b) answering the questions and completing the exercises in the study guides (one study guide for each of the 12 Phase I academic units trained during the first training year). Home-study of Phase II academics was not possible because all the illustrated lectures and NOE navigation exercises, which comprise Phase II academics, are TEC lessons that require the use of the Bessler Cue/See training device.

At the outset of the on-site training, all IRR aviators were required to complete the 221-item diagnostic examination. Most IRR aviators completed the diagnostic examination on the afternoon of the first on-site training day; the remainder completed the examination on the morning of the second day. The results of the diagnostic examination dictated the type and amount of academic study IRR aviators were required to engage in on site. A score of 90% or higher on a diagnostic subtest excused an IRR aviator from any further study of the associated academic unit. A score of less than 90% on a diagnostic subtest required an aviator to engage in on-site academic study of the associated academic unit and to be retested.

Regular on-site academic study and testing occurred during the periods specified on the general training schedule (see Table 9). A room, containing a desk and chair for each IRR aviator, was provided for the academic study periods. A monitor was available throughout each academic study period to answer administrative questions and to administer and score quizzes. Attendance at the academic study periods was mandatory; academic study before or after the scheduled academic study periods was optional.

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[7]At the outset, two weeks were considered sufficient time to complete home-study. However, interviews with IRR aviators who participated in the first-year evaluation indicated that two weeks is not enough time. Accordingly, Section II recommends that IRR aviators receive the academic materials no less than one month before their scheduled departure for on-site training.

On-site study of the academic units was completed one unit at a time, in the order shown in Table 2. Academic study of the unit consisted of reading the reference material and completing the questions and exercises in the study guide for the unit being studied. Form A of the unit quiz was administered as soon as the IRR aviator had read the reference material and completed the study guide. The IRR aviator was given as much time as was needed to complete the unit quiz. The quiz was scored immediately by the monitor, and the IRR aviator was informed of his score.

As was stated in Section II, aviators who scored 90% or higher on the unit quiz were instructed to begin study of the next academic unit in the series. Aviators who scored less than 90% on the unit quiz were informed of the questions they had answered incorrectly and were instructed to review the parts of the reference materials and the parts of the completed study guide that pertain to the items answered incorrectly. Form B of the unit quiz was administered as soon as the IRR aviator completed the review. Aviators who scored 90% or higher on Form B of the unit quiz were instructed to proceed to the next academic unit in the sequence. Aviators who scored less than 90% on Form B of a unit quiz were provided with individual tutoring by an IP. Once the IP was satisfied that the IRR aviator had sufficient knowledge of the material, the IP "signed off" on the unit and the IRR aviator proceeded to the next academic unit in the sequence.

The procedure described above was repeated until the IRR aviator had completed all the Phase I academic units not exempted by 90% performance on the corresponding subtests of the diagnostic examination. Then, the aviator proceeded through the 13 MITAC lessons.

Flight Training Procedure

The flight training procedure used in this research was the same as that illustrated in Figure 2 and discussed in Section II. Prior to the first training flight, each IRR aviator was given a proficiency flight evaluation on Phase I tasks by the IP who had been assigned responsibility for training the IRR aviator. During the Phase I proficiency flight evaluation, the IP evaluated the IRR aviator's proficiency on most Phase I tasks. The IP used the information acquired during the proficiency evaluation to tailor a program to the needs of the individual aviator.

Throughout Phase I training, the IPs were responsible for continuously adjusting the training as necessary to spend time only on the flying tasks for which the IRR aviator had not yet become proficient. Most Phase 1 training was conducted at a Fort Rucker airport, a stagefield, or enroute between a Fort Rucker airport and a stagefield. Training on confined area landings and pinnacle landings was conducted at a tactical training area.

A Phase I checkride was administered as soon as the IP judged that the IRR aviator was capable of performing all Phase I tasks to ATM standards. An attempt was made to schedule a checkride with a Directorate of Evaluation and Standardization (DES) Standardization Instructor Pilot (SIP). However, due to the heavy commitment of SIPs, it was often impossible to schedule a DES SIP checkride without a significant loss of training time. When a DES SIP checkride was not feasible, the checkride was administered by a project IP other than the one responsible for training the IRR aviator. When a checkride was administered by a DES SIP, the IP who trained the aviator observed and assessed performance from the UH-1 cockpit jump seat. Seventeen of the 58 checkrides were administered by a DES SIP; the remainder were administered by a project IP.

An IRR aviator was given a Phase II proficiency flight evaluation on the first training day after passing the Phase I checkride if (a) there were at least three training days remaining in the 19-day training period, or (b) the project IP judged that the IRR aviator was sufficiently skilled to complete a proficiency flight evaluation and a Phase II checkride in the time remaining.

The information acquired during the Phase II proficiency evaluation was used by the project IP to tailor Phase II training to the needs of the individual IRR aviator. A Phase II checkride was given to the IRR aviators who were judged capable of performing all Phase II tasks to ATM standards. All Phase II checkrides were administered by project IPs.

The training time remaining after passing the Phase II checkride was devoted to instrument flight training or to additional practice on Phase I or Phase II tasks. However, as is discussed in the Results section (Section IV), only 10 IRR aviators progressed beyond the Phase II checkride during the first training year.

Inflight Performance Assessment Methods

The inflight performance assessment methods used in this research were developed to provide sensitive, objective research data; these methods are not recommended for use in a typical training situation.

Two types of measures were used to assess IRR aviators' proficiency on the flight tasks: one for procedural tasks and one for psychomotor tasks. The measure used for procedural tasks was simply the number of procedural steps the IRR aviator omitted while performing the task. For example, a score of "3" was recorded when three procedural steps were omitted. A score of "0" was recorded when the procedural task was performed correctly. A maximum score of "5" was recorded when five or more procedural steps were omitted. The tasks assessed by number of procedural omissions include:

- Plan a VFR Flight (1001)
- Prepare Weight and Balance Form (1003)
- Use Performance Charts (1004)
- Prepare Performance Planning Card (1005)
- Perform Preflight Inspection (1501)
- Perform Before Takeoff Checks (1502)
- Perform Fuel Management Procedures (3006)
- Perform Before-Landing Checks (3501)
- Perform After-Landing Checks (6501)
- Perform Radio Procedures (not an ATM task)

Instructors used a seven-point, verbally anchored rating scale to assess performance on psychomotor tasks. The verbal anchors for each rating-scale value are shown in Table 11. The verbally anchored rating scale is similar to rating scales developed and used by Holman (1979) and by Bickley (1980). Bickley's (1980) rating scale was modified slightly in accordance with recommendations made by IPs who had previously used verbally anchored rating scales. Ratings of "5" or less represent unsatisfactory performance; that is, performance that does not meet ATM standards. A rating of "6" or "7" represents performance that meets or exceeds ATM standards.

TABLE 11

FLIGHT TASK RATING SCALE

RATING	VERBAL ANCHOR
1	Performance unsafe to the extent that the IP immediately had to take control of the aircraft.
2	Performance deteriorated until IP was finally required to take control of the aircraft.
3	None of the ATM standards were met, student required considerable verbal assistance but maintained control of the aircraft.
4	Less than half of the ATM standards were met, student required some verbal assistance and frequently over-controlled.
5	More than half of the ATM standards were met, student required little or no verbal assistance, but tended to slightly over-control or accepted slight deviations without corrections.
6	All ATM standards were met, most deviations were quickly noticed and smoothly corrected.
7	All performance within IP standards (one-half ATM standards), any deviations were small and immediately corrected.

Performance assessment data were collected during every training flight and every evaluation flight. Proficiency on most tasks was assessed during the proficiency flight evaluations and during the post-training checkride. Proficiency on all tasks practiced was assessed during each training flight. The performance assessment was made by the IP who was assigned responsibility for training the IRR aviator. When a checkride was conducted by a DES SIP, the IRR aviator's IP assessed performance from the jump seat. When a checkride was conducted by a project IP, the IRR aviator's performance was evaluated by the IP conducting the checkride.

Performance ratings were recorded on the inflight data collection form shown in Appendix B. Other data items recorded on the inflight data-collection form are listed below.

- IRR aviator's name,
- IRR aviator's social security number,
- IRR aviator's rank,
- IP's name,
- purpose of flight (proficiency evaluation, training, or checkride),
- whether or not a "put-up" flight (last training flight before a checkride),
- flight number,
- flight time accumulated during flight,
- wind direction and velocity,
- lighting conditions (day vs. night), and
- number of iterations for each task performed/practiced during the flight.

SECTION IV: RESULTS OF FIRST TRAINING YEAR

This section describes the results of the evaluation. A description of the results of the academic training evaluation is followed by a description of the results of the flight training evaluation.

EVALUATION OF PHASE I ACADEMIC TRAINING: FIRST TRAINING YEAR

The analyses of the Phase I academic training data address four questions. The first and most critical question is: Can an IRR aviator acquire the necessary level of academic knowledge through self-study alone? The remaining questions are relevant only if self-study proves effective.

The second question is: How how much on-site training time must an IRR aviator expend to complete academic training? It seems reasonable to hypothesize that the amount of on-site training time needed to complete academic training will vary as a function of (a) the amount of home study the IRR aviator engages in prior to arriving at the training site, and (b) the amount of time that has elapsed since the IRR aviator left active duty. Hence, the third question: To what extent can amount of on-site academic-study time be predicted from a knowledge of (a) amount of home-study completed, and (b) the time that has transpired since the aviator left active duty?

The fourth and final question addressed in this subsection is: To what extent are IRR aviators willing to engage in home study? It must be stated at the outset that the data bearing on willingness to engage in home study must be interpreted with care. Two problems must be kept in mind to avoid misinterpreting these data:

- because of late assignment to the program, 23 of the 47 IRR aviators did not receive the home-study materials prior to on-site training, and
- many aviators indicated that they would have devoted more time to home study if they had received the home-study materials more than two weeks before departing for on-site training.

For these reasons, the data presented here must be treated as an extremely conservative estimate of the amount of time the typical aviator would be willing to devote to home study.

Effectiveness of Academic Training

The effectiveness of the self-study approach to academic training must be evaluated in terms of two criteria:

- the extent to which IRR aviators can achieve the requisite level of knowledge through self-study alone, and

- the amount of on-site training time needed to complete the academic training.

Another factor that must be considered in assessing academic training is the academic knowledge deficiencies that exist at the outset of academic training. Pre-training knowledge level indicates the extent to which academic training is needed. More importantly, consideration of pre-training academic knowledge is essential for making judgments about whether or not the requisite knowledge can be achieved in a reasonable amount of training time.

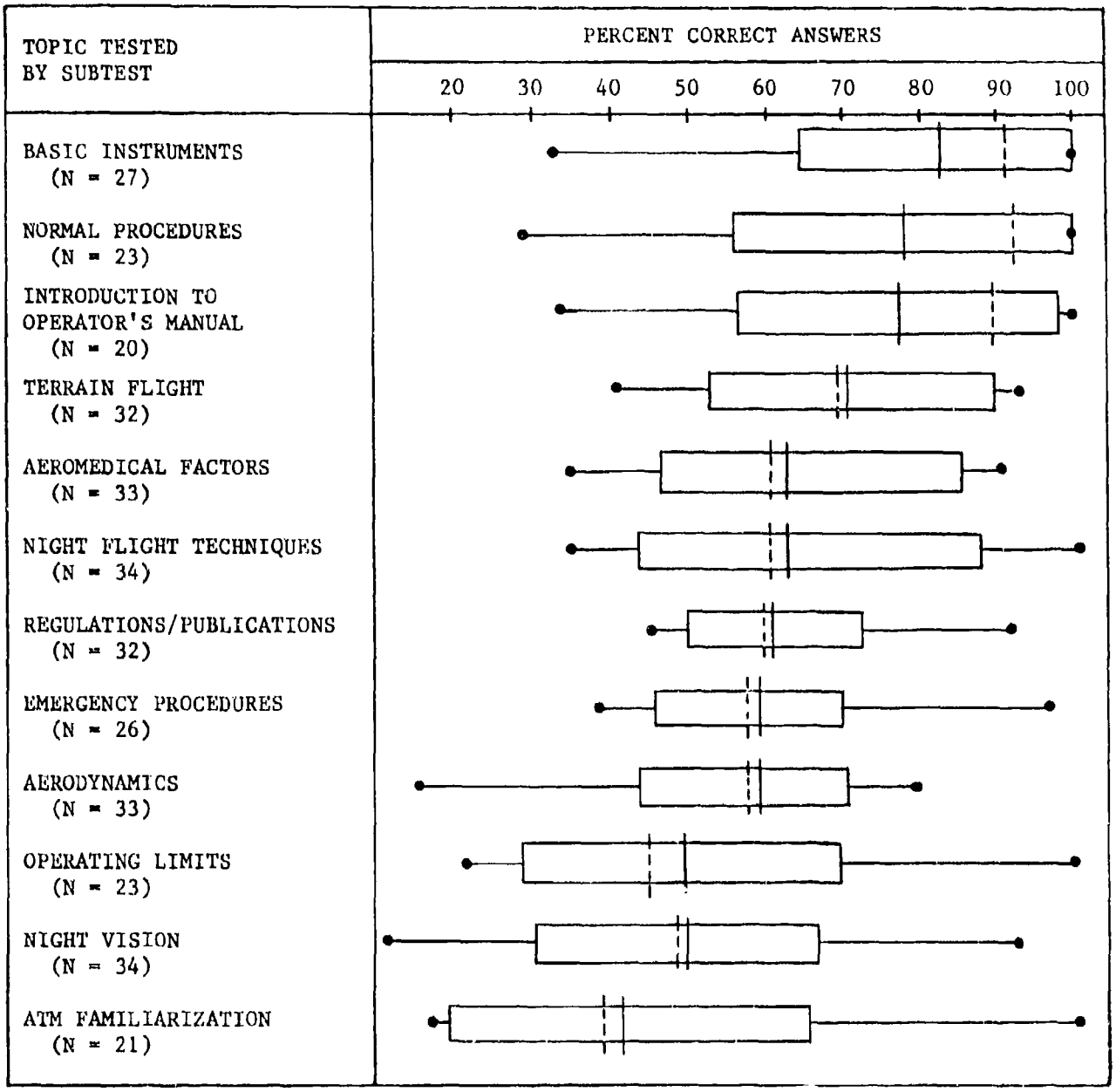
Data bearing on the above issues are presented below. This subsection begins with data on the IRR aviators' pre-training level of academic knowledge. Then, data are presented on the level of academic knowledge acquired during academic training. Finally, data are presented on the amount of on-site training time required to complete academic training.

Pre-training level of academic knowledge. Data were collected on two indices of pre-training academic knowledge: (a) pass rate for the oral examination administered as part of the proficiency flight evaluation, and (b) scores on the diagnostic examination. Pass rate on the pre-training oral examination is an insensitive measure of the pre-training level of academic knowledge. Even so, it provides some useful information when evaluated in conjunction with scores on the diagnostic examination.

All 47 aviators failed their pre-training oral examination. Failure to pass the pre-training oral examination does not necessarily mean that the aviators had major academic knowledge deficiencies. On the contrary, project IPs reported that many IRR aviators demonstrated a thorough knowledge of some of the topics covered in the oral examination. These findings indicate only that every IRR aviator had insufficient knowledge about at least one academic topic.

The best data available on pre-training knowledge are scores on the various subtests of the diagnostic examination that was administered to all IRR aviators on the first or second on-site training day, before on-site academic training began. Scores on the diagnostic examination are not a valid indicator of pre-training knowledge for IRR aviators who engaged in home study, so the analyses discussed below include only the subtest scores for the academic units that were <u>not</u> studied at home. For instance, if an aviator studied the first two academic units at home, the scores on the two corresponding subtests were excluded from the analysis, and the scores on the remaining 10 subtests were included.

Figure 3 shows the distribution of diagnostic subtest scores for each of the 12 academic topics. The academic topics are ordered in Figure 3 according to the mean subtest score--beginning at the top with the largest mean score. Note that the data presented are the mean percent of questions answered correctly. The key at the bottom of



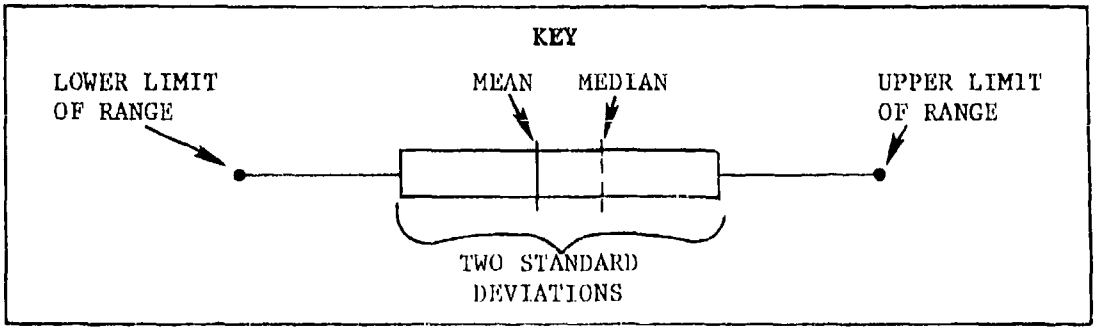


Figure 3. Distribution of diagnostic subtest scores prior to start of academic training (percent correct).

Figure 3 explains the symbolic representation. The horizontal bar represents the magnitude of two standard deviations (SD)--one SD above the mean and one SD below. About 67% of the scores fall within the two SD limit. The solid vertical line crossing the horizontal bar shows the value of the mean score; the dashed vertical line crossing the bar shows the value of the median. The solid horizontal line depicts the range of scores. The left-hand limit of the horizontal line shows the lowest score; the right-hand limit of the horizontal line shows the highest score in the distribution. The numbers on which the percentage values are based are shown below the topic name.

Perhaps the most striking finding evident in Figure 3 is the large variability of the scores. The extent of the variability is shown by both the range and standard deviation of scores. The range indicates the extreme cases: the lowest and highest score achieved by at least one aviator in the sample. The subtest for Terrain Flight yielded the smallest range: 53 percentage points. A similar range was found for the subtests on Regulations and Publications (54 percentage points) and Emergency Procedures (57 percentage points). Subtests yielding the highest range of scores include: Operating Limits (79 percentage points), Night Vision (80 percentage points), and ATM Familiarization (83 percentage points).

Next, examine the SD of subtest scores. (Keep in mind that the horizontal bar in Figure 3 represents two SDs--one SD above and one SD below the mean--and that about two-thirds of the test scores fall within the limits of the bar.) The SDs were found to vary in size from 11 to 22 percentage points. Figure 3 shows that one group of three subtests has SDs that are small relative to the others: Regulations and Publications (SD = 11 percentage points), Emergency Procedures (SD = 12 percentage points), and Aerodynamics (SD = 14 percentage points). The SD for the remaining subtests are larger and relatively uniform, varying from 18 to 22 percentage points.

The mean scores and median scores provide an estimate of the level of knowledge that a typical IRR aviator will possess prior to the onset of academic training. Figure 3 shows that the mean and median scores are nearly the same for most subtests. (Similar values for the mean and median indicate that subtest scores are uniformly distributed about the mean.) Substantial differences between the mean score and median score were found for only three subtests: Basic Instruments (8 percentage points), Introduction to Operator's Manual (11 percentage points), and Normal Procedures (14 percentage points). In all three cases, the medians are larger than the means.

The mean scores and median scores show that the IRR aviators in the sample possessed a substantial amount of academic knowledge before they began academic training. For three subtests, the median score exceeded 90% (Basic Instruments, Normal Procedures, and Introduction to Operator's Training Manual); in other words, one-half of the IRR aviators in the sample were able to answer correctly at least 90% of the

questions on the subtests. The mean scores for the three subtests are about 10 percentage points less than the corresponding median scores, indicating that the distributions of subtest scores are negatively skewed (bunched at the high end of the continuum with relatively few very low scores). The mean and median scores for the remaining subtests vary from 38 percent (ATM Familiarization) to 72 percent (Terrain Flight). So, in the worst case (ATM Familiarization), one-half of the IRR aviators were able to correctly answer at least 38% of the items before commencing academic training.

Before concluding the discussion of pre-training knowledge level, it is important to note that the diagnostic subtest scores shown in Figure 3 are not a pure indicator of knowledge that has been forgotten or, conversely, retained. In many instances, IRR aviators were being tested on material they had not been exposed to while on active duty. Perhaps the most extreme example is the subtest for ATM Familiarization. Some IRR aviators in the sample left active duty before ATMs were published, so had no knowledge about ATMs prior to being tested.

The data presented above support two conclusions. First, nearly all IRR aviators will require some amount of academic training. Although the IRR aviators possessed a substantial amount of knowledge prior to training, the knowledge level was inadequate in most cases. Second, a self-paced approach to academic training is essential. The data on subtest score variability confirm that IRR aviators are a highly heterogeneous population with respect to the academic knowledge they bring to the training situation. Thus, any academic program with a fixed schedule of progression would prove inefficient for a large proportion of IRR aviators.

Post-training knowledge level. This research provided two indicators of the knowledge level acquired through self-study: the pass rate and average scores for the post-training paper-and-pencil examinations, and the pass rate for the oral examination administered as part of the Phase I checkride. Both indicators show that an acceptable level of academic knowledge can be acquired through self-study alone.

Consider first the pass rate and average scores for the paper-and-pencil examination. It will be recalled that a score of 90% on either the diagnostic subtest or the unit examination was required to complete academic training on an academic topic. It was found that with only one exception, every aviator was able to achieve a 90% score on every unit exam through self-study. One IRR aviator was unable to achieve a 90% score on one academic topic (aerodynamics) through self-study alone. He scored 88% correct on his second attempt to pass the unit examination, so this aviator required only 30 minutes of remedial tutoring from a project IP to achieve the necessary level of knowledge on the topic. Therefore, when averaged across all aviators and academic topics, the pass rate on the paper-and-pencil examination is 99.8% with self-study alone.

Table 12 shows, for each academic topic, the percent of IRR aviators who passed the diagnostic subtest and, for those who failed to pass the diagnostic subtest, the percent who passed the unit examination on the first and second attempts. When interpreting the data presented in Table 12, note that no differentiation is made between aviators who engaged in home-study and those who did not.[8] It can be seen in Table 12 that few IRR aviators required a second attempt to pass the unit examination. In the worst case, Night Vision, 9% required a second attempt to achieve the passing grade of 90% correct. For all other subtests, 6% or fewer required a second attempt to achieve a passing grade.

TABLE 12

PERCENT OF IRR AVIATORS WHO PASSED DIAGNOSTIC SUBTEST AND PERCENT WHO PASSED UNIT EXAM ON FIRST/SECOND ATTEMPT (N=47)

TOPIC TESTED BY SUBTEST	PASSED DIAGNOSTIC EXAMINATION (%)	PASSED UNIT EXAMINATION		TOTAL (%)
		FIRST ATTEMPT (%)	SECOND ATTEMPT (%)	
BASIC INSTRUMENTS	68	32	0	100
NORMAL PROCEDURES	60	34	6	100
INTRODUCTION TO OPERATORS MANUAL	55	43	2	100
TERRAIN FLIGHT	38	60	2	100
AEROMEDICAL FACTORS	26	70	4	100
NIGHT FLIGHT TECHNIQUES	30	70	0	100
ATM FAMILIARIZATION	28	70	2	100
OPERATING LIMITS	15	85	0	100
NIGHT VISION	9	82	9	100
AERODYNAMICS	7	89	2	98
EMERGENCY PROCEDURES	7	89	4	100
REGULATIONS/PUBLICATIONS	4	92	4	100

Since all IRR aviators were trained to the 90% criterion, the examination scores can only confirm what is indicated by pass rate. Table 13 shows, by academic topic, the average score achieved on the paper-and-pencil exam (diagnostic subtest or unit examination) on which the 90% criterion was achieved. These scores represent the best quantitative estimate of the post-training level of academic knowledge achieved. The best estimate of the pre-training level of academic knowledge is the mean diagnostic subtest scores achieved by the sample of IRR aviators who did not engage in home-study (see Figure 3 and previous discussion). These mean scores are also shown in Table 13.

[8]The benefits of home-study are addressed in a later subsection.

TABLE 13

INDICATORS OF PRE-TRAINING AND POST-TRAINING
LEVEL OF ACADEMIC KNOWLEDGE

ACADEMIC TOPIC	MEAN SCORE PRE-TRAINING*	MEAN SCORE POST-TRAINING**
BASIC INSTRUMENTS	83	93
NORMAL PROCEDURES	79	95
INTRODUCTION TO OPERATORS MANUAL	79	95
TERRAIN FLIGHT	72	96
AEROMEDICAL FACTORS	65	93
NIGHT FLIGHT TECHNIQUES	65	95
REGULATIONS/PUBLICATIONS	61	95
EMERGENCY PROCEDURES	57	95
AERODYNAMICS	56	95
OPERATING LIMITS	48	95
NIGHT VISION	48	95
ATM FAMILIARIZATION	42	93

*Mean scores on subtests of the diagnostic examination, which was administered prior to onset of training. Includes only aviators who did not engage in home-study.

**Mean score on examination (diagnostic subtest or unit examination) on which 90% criterion was achieved.

Comparison of the pre-training and post-training scores provides an indication of the average amount of academic knowledge that was, in fact, acquired through self-study.

The final indicator of post-training knowledge level--pass rate for the oral examination--needs little discussion. The academic training enabled every aviator to pass the oral examination administered as part of the Phase I checkride. In short, the pass rate was 100%. Eighty-nine percent of the IRR aviators passed the oral examination on their first attempt; the remainder passed the oral examination on their second attempt.

On-site Time Devoted to Academic Training

Throughout the following discussion, the time required to complete academic training is described in terms of "training days." A training day is defined as a four-hour period that is devoted to academic self-study and to testing on academic topics. As defined here, the number of training days devoted to academics does not include the time spent on inprocessing or the time spent on the diagnostic examination. The number of training hours devoted to academics can be estimated by multiplying the number of training days by four. It should be noted,

however, that training days and training hours are not perfectly correlated. There were some instances in which IRR aviators did not spend a full four hours on academics each training day. Exceptions to the four-hour rule occurred when an IRR aviator completed a study unit or an examination within an hour of the end of the period. In such instances, the IRR aviator was typically excused for the remainder of the period.

Summary statistics for the analysis of training days devoted to academic training are shown in Table 14. It can be seen that the mean and standard deviation of a distribution is 7.6 days and 1.5 days, respectively. This means that, on the average, IRR aviators required 7.6 days to complete academic training and that about 67% required more than 6.1 days and less than 9.1 days (67% of the distribution falls within ±1 standard deviation of the mean). The mean and median are essentially the same, so it can be concluded that the data are distributed symmetrically about the mean. The total range is seven days, varying from a low of five days to a high of 12 days.

TABLE 14

SUMMARY STATISTICS FOR TRAINING DAYS
DEVOTED TO ACADEMIC TRAINING
(N = 47)

STATISTIC	VALUE
MEAN	7.6
STANDARD DEVIATION	1.5
MEDIAN	7.5
RANGE	5.0 - 12.0

Predictability of On-site Academic Study Time

A cursory examination of the raw data suggested that the day on which academic training was completed (hereafter abbreviated ACADAY) varied as a function of (a) the number of academic units completed during home study (hereafter abbreviated UNITSCOMP), and (b) the amount of time elapsed since the IRR aviator left active duty (hereafter abbreviated YEARSOUT). The hypothesized relationship among these three variables was confirmed by a correlational analysis; the results are shown in Table 15. It can be seen that ACADAY is negatively correlated with UNITSCOMP and positively correlated with YEARSOUT. In other words, ACADAY decreases as a function of UNITSCOMP and increases as a function of YEARSOUT. The coefficient of correlation between ACADAY and UNITSCOMP ($r = -.42$) is statistically reliable ($p < .001$, one-tailed test) and shows that the relationship between ACADAY and UNITSCOMP is moderately strong. The coefficient of correlation between ACADAY and

TABLE 15

CORRELATIONS AMONG THE VARIABLES:
ACADAY, UNITSCOMP, AND YEARSOUT

	UNITSCOMP	YEARSOUT
ACADAY	-.42**	.28*
YEARSOUT	.02	

*Significant at .05 level, one-tailed test.
**Significant at .01 level, one-tailed test.

YEARSOUT ($r = .28$) indicates a relationship that is weak but statistically reliable ($p < .05$, one-tailed test). As would be expected, the correlation between YEARSOUT and UNITSCOMP is effectively zero ($r = .02$).

A linear multiple regression analysis was conducted to derive an equation that yields the best prediction of ACADAY given known values for UNITSCOMP and YEARSOUT. The equation derived is as follows:

$$Y = 6.72 - .168X_1 + .161X_2$$

where:

Y = estimate of the training day on which an IRR aviator will complete academic training (ACADAY)

X_1 = the number of academic units that an IRR aviator completes during home-study (UNITSCOMP), and

X_2 = the number of years since the IRR aviator left active duty (YEARSOUT).

There are two statistical indices of the predictive utility of a multiple regression equation. The first index is the coefficient of multiple correlation (abbreviated R). The R is an index of the strength of the relationship between the dependent variable (ACADAY) and the independent variables (UNITSCOMP and YEARSOUT), when optimal regression weights are used. The multiple regression analysis produced an R of .52--a value that is highly significant statistically [$p(F(2,34) = 6.4) < .005$]. The second index is the coefficient of multiple determination (R^2), which indicates the proportion of variance in the dependent variable that is predicted by the combined independent variables (with the regression weights used). In this case, the R^2 was found to be .27. This means that the multiple regression equation accounts for 27% of the variance in ACADAY. A statistic referred to as shrunken R^2 provides a conservative estimate of the variance in the dependent variable that would be predicted if the regression equation was applied to a new sample of IRR aviators. The computed value of the shrunken R^2 in this case is .22.

The values of R, R^2, and shrunken R^2 indicate that the multiple regression equation is a statistically reliable and practically useful tool for predicting the number of training days a specific individual will require to complete Phase I academic training, given a knowledge of that aviator's UNITSCOMP and YEARSOUT. A unit commander should find the regression equation useful when faced with the job of estimating the resources needed to train one or more IRR aviators newly assigned to his unit.

To illustrate the relationship among ACADAY, UNITSCOMP, and YEARSOUT, the regression equation was used to plot the regression lines shown in Figure 4. The regression lines show the relationship between ACADAY and YEARSOUT for three levels of home study (0, 6, and 12 academic units completed during home study). Although Figure 4 is presented mainly for illustration purposes, several facts are worth noting.

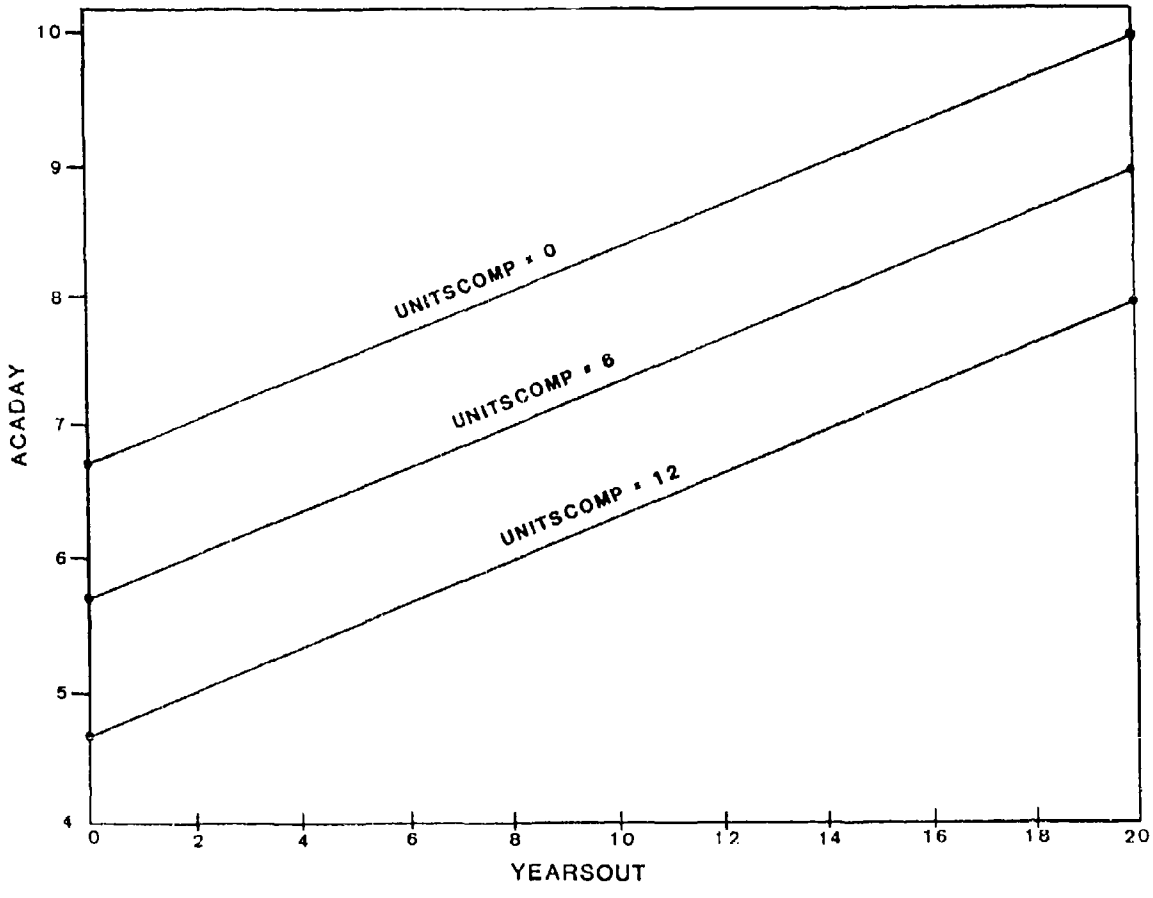


Figure 4. Relationship between ACADAY and YEARSOUT for three levels of home-study.

First, note the value of ACADAY for the best case and worst case conditions. The regression line for UNITSCOMP = 12 shows that an aviator who had completed 12 academic units during home-study and who had left active duty less than one year before IRR training would be expected to complete academic training in about five training days. At the other extreme, the aviator who completed no home-study and who left active duty 20 years before IRR training would be expected to complete academic training in about ten days.

Next, note the average training time saved as a result of home-study. The training time saved by home-study is reflected by the vertical distance between the regression lines for any level of YEARSOUT. For any level of YEARSOUT, the aviator who completed all 12 home-study units can be expected to complete academic training in about two days less than the aviator who completes no home-study units.

Finally, note the extent to which home-study offsets the adverse effect of YEARSOUT. An aviator who left active duty 13 years before IRR training and who completes all home-study units can be expected to complete academic training in the same amount of time as an aviator who has been away from active duty for only one year, but completes no home-study.

Willingness to Engage in Home-Study

The best index of willingness to engage in home-study is the number of academic units completed by the IRR aviators who, in fact, received the home-study materials. Twenty-four IRR aviators received the home-study materials soon enough to have completed some home-study. Figure 5 shows the percent of aviators who completed one unit, two units, ..., 12 units during home-study. It can be seen that 79% of the aviators completed at least one academic unit and that 75% completed at least three units. The percentage values can be seen to decrease rapidly as units completed increases from three to seven. The most precipitous decrease is between six and seven units; 50% completed at least six units and only 29% completed at least seven unit. The percentages remain the same (29%) for seven, eight, and nine units completed and drop only slightly for 10, 11, and 12 units. All 12 academic units were completed by 21% of the IRR aviators in the sample.

The above results should be interpreted with caution. As has been stated earlier, many aviators reported that they would have completed more home-study if they had received the home-study materials sooner. For this reason, the above data should be treated as a very conservative indicator of IRR aviators' willingness to engage in home-study.

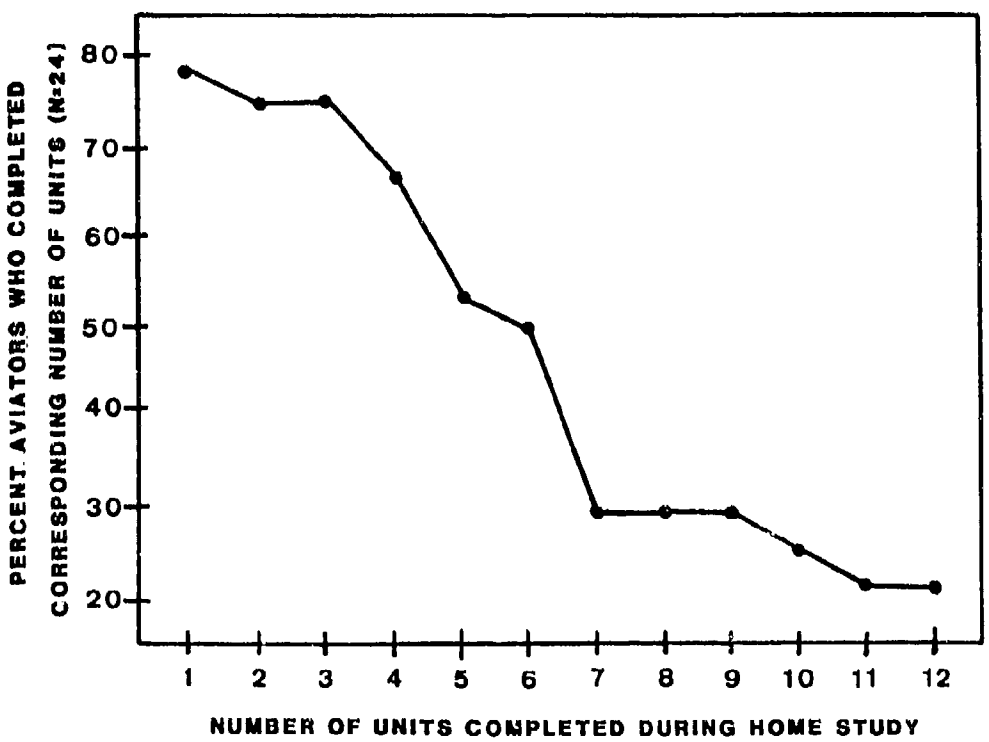


Figure 5. Home-study units completed by IRR aviators who received home study materials.

EVALUATION OF PHASE I FLIGHT TRAINING: FIRST TRAINING YEAR

As described previously, the flight portion of the IRR training program is identical to the inflight training prescribed in the first version of the training program (Everhart & Allnutt, 1981). Although no changes to the flight training were made, it is nonetheless important to evaluate aviator performance on the flight tasks to determine if changes made in the academic portion of the training program have adversely affected the aviators' ability to reacquire flying skills and to pass the inflight portion of the Pilot's Flight Evaluation. The analyses of Phase I flight training data address the following questions.

- What is the typical flying skill level of IRR aviators prior to Phase I flight training (first year)?
- How many IRR aviators are able to complete Phase I flight training during the first on-site training period?
- How many flight hours are required by the typical IRR aviator to complete Phase I flight training? To what extent can the number of hours required to complete Phase I flight training be predicted from a knowledge of (a) an IRR aviator's prior flight

experience, and (b) the amount of time that has expired since the aviator left active-duty flying?

- How many practice iterations are required to regain proficiency on each of the flight tasks? Do tasks that were more poorly performed on the initial checkride require a greater number of iterations to regain proficiency?
- How many IRR aviators can complete Phase I flight training and proceed to Phase II flight training during the 19-day period? How many flight hours are required to complete Phase II flight training?

Performance on Phase I Proficiency Flight Evaluation

None of the 47 IRR aviators in the sample were sufficiently skilled to pass the proficiency flight evaluation administered prior to Phase I flight training. Initial skill level, as measured by the proficiency flight evaluation, was found to vary greatly among IRR aviators and among flying tasks. Table 16 shows descriptive statistics for IP ratings on each task assessed during the proficiency flight evaluation; the mean rating and standard deviation are shown along with the range of the ratings. Note that psychomotor tasks and procedural tasks are presented separately, and note that tasks are listed in rank order according to mean rating, beginning at the top with the tasks for which performance was poorest.

The data in Table 16 are purely descriptive and require little interpretation. However, two points are worth noting. First, it is important to note that the task ratings are a joint function of inherent task difficulty, level of skill at the time the IRR aviator left active duty, and skill decay; that is, task difficulty skill level and skill decay are confounded. So, caution must be exercised in using the data in Table 16 to make inferences about the relative rate of skill decay. Second, it is important to emphasize that the ratings on the psychomotor tasks cannot be directly compared with the scores on the procedural tasks; the former is a rating scale value, and the latter is a score of procedural steps omitted.

Time Required to Complete Phase I Flight Training

The time required to complete Phase I flight training is described in terms of the aircraft hours expended to complete (a) the proficiency flight evaluation, (b) inflight training on Phase 1 tasks, and (c) the Phase I checkride. The total IP time expended on Phase 1 flight training can be estimated by multiplying the flight hours by 2. That is, the IP spent about 1 hour on table talk and administrative duties for each hour logged in the aircraft.

TABLE 16

MEANS, STANDARD DEVIATIONS, AND RANGES OF RATINGS ON TASKS ASSESSED DURING THE PROFICIENCY FLIGHT EVALUATION

RANK ORDER	TASK	M	RANGE			
			SD	MIN	MAX	N
	Psychomotor Tasks[a]					
1	Antitorque Malfunction	3.00	1.12	1	5	43
2	Standard Autorotation	3.27	1.36	1	6	45
3	Emergency Procedures	3.42	1.35	1	6	33
4	IFR Recovery Procedures	3.50	1.38	1	5	18
5	Low Level Autorotation	3.57	1.40	1	6	44
6	Hydraulic Failure	3.79	1.34	1	6	43
7	Manual Throttle Opns	3.97	1.05	2	5	29
8	Engine Failure Altitude	4.18	1.38	1	7	33
9	Simulated Max Takeoff	4.26	0.99	2	6	39
10	Hover Power Check	4.31	1.39	1	6	39
11	Steep Approach	4.31	0.92	3	6	36
12	Normal Approach	4.33	1.00	1	6	40
13	Hovering Autorotation	4.33	1.37	1	7	40
14	Shallow Approach	4.37	1.08	2	6	38
15	Confined Area Opns	4.44	1.08	2	6	23
16	Normal Takeoff	4.46	0.93	3	6	41
17	Pinnacle/Ridgeline Opns	4.48	1.18	2	7	29
18	Engine Failure Hover	4.53	1.08	2	6	34
19	Decel/Accel	4.55	0.99	2	6	29
20	Go-Around	4.58	1.24	2	6	26
21	High Reconnaissance	4.58	1.18	2	6	31
22	Traffic Pattern	4.63	1.06	2	7	40
23	Takeoff to a Hover	4.65	0.98	3	6	40
24	Hovering Turn	4.70	0.91	3	6	40
25	Slope Operations	4.79	1.13	2	7	28
26	Climbs/Descents	4.85	0.96	3	7	39
27	Turns	4.85	1.01	3	7	39
28	Hovering Flight	4.90	1.06	3	7	40
29	Straight/Level Flight	4.90	1.10	1	7	39
30	Landing From a Hover	5.03	0.94	3	7	36
	Procedural Tasks[b]					
1	Prepare PPC	4.45	0.81	2	5	31
2	Performance Charts	4.43	0.81	2	5	31
3	Plan VFR Flight	4.24	1.17	0	5	33
4	Preflight Inspection	4.19	1.17	0	5	31
5	Radio Procedures	4.10	1.85	2	5	19
6	Weight & Balance Form	3.95	1.24	0	5	21
7	Before Landing Check	3.38	1.78	0	5	34
8	Before Takeoff Check	3.47	1.95	0	5	32
9	After Landing Check	3.47	1.95	0	5	32
10	Fuel Management Proc.	3.17	2.10	0	5	23

[a]Rated from "1" (lowest) to "7" (highest); a rating of 6 or higher is a passing grade.

[b]Values are omissions of a procedural step, varying from "0" (no omissions) to a maximum of 5.

Table 17 presents summary statistics for the analyses of aircraft hours required to complete Phase I flight training. It can be seen that, on the average, the IRR aviators required nearly 17 flight hours to complete the training and pass the checkride (mean = 16.8 hours). In the best case, an aviator required only 10.2 flight hours; in the worst case, 25.5 hours were required. About two-thirds of the aviators required more than 13.6 hours and less than 20.0 hours to complete flight training (mean ± one standard deviation). The mean and median are nearly equal, indicating that the distribution of aircraft hours is symmetrical.

A standard multiple regression analysis was performed to determine the extent to which the number of flight hours required to complete Phase I flight training (FLTTRAINHRS) can be predicted from knowledge of (a) the total military flight hours (MILFLTHRS), and (b) the number of years that had elapsed since the aviator had flown as an active Army aviator (YEARSOUT).

Four cases were eliminated because of violation of the statistical assumptions of regression. Another case was removed because of an excessive amount of missing data. This resulted in a sample size of 42. Means, standard deviations, and correlations for the reduced aviator sample are shown in Table 18.

TABLE 17

SUMMARY STATISTICS FOR AIRCRAFT HOURS REQUIRED TO COMPLETE PHASE I FLIGHT TRAINING

STATISTIC	VALUE (N=47)
MEAN	16.8
STANDARD DEVIATION	3.2
MEDIAN	16.5
RANGE	10.2-25.5

TABLE 18

MEANS, STANDARD DEVIATIONS, AND CORRELATIONS FOR AVIATORS INCLUDED IN STANDARD MULTIPLE REGRESSION OF FLIGHT TRAINING (N = 42)

VARIABLE	MEAN	STANDARD DEVIATION	CORRELATION	
			FLTTRAINHRS	YEARSOUT
MILFLTHRS (IV)	1330.50	713.60	-0.28	0.11
YEARSOUT (IV)	8.21	3.36	0.46	1.00
FLTTRAINHRS (DV)	16.55	3.24	1.00	0.46

As in the analysis of the time to complete academic training, the standard multiple regression analysis was performed to produce a regression equation that utilizes demographic information to predict training time. The present analysis was performed to predict flight hours, whereas the analysis described earlier was performed to predict academic training days. However, the basic underlying purpose, method, and interpretation are the same. The multiple regression equation yielded by the analysis is shown below.

$$Y = 14.68 + .48X_1 - .0015X_2$$

where:

Y = estimate of the number of flight hours required to complete Phase I flight training (FLTTRAINHRS)

X_1 = the number of years since the aviator has flown on active duty (YEARSOUT)

X_2 = the number of flight hours accumulated when on active duty (MILFLTHRS).

The multiple regression analysis yielded an R (coefficient of multiple correlation) of .57. A test of the statistical significance of this R yielded an F-ratio (2 and 39 degrees-of-freedom) of 9.19, a value that would be expected by chance less than one time in one thousand. The computed value of the coefficient of multiple determination (R^2) is .32, indicating that 32% of the variance in FLTTRAINHRS is predicted by the combined independent variables YEARSOUT and MILFLTHRS. The computed value of shrunken R^2 is .29; thus, it is estimated that the regression equation would predict 29% of the variance in FLTTRAINHRS if applied to a new sample of IRR aviators.

The values of R, R^2, and shrunken R^2 indicate that the multiple regression equation is a statistically reliable and practically useful tool for predicting the number of flight hours an aviator will require to complete Phase I, given a knowledge of that aviator's MILFLTHRS and YEARSOUT.

The regression lines in Figure 6 were plotted to illustrate the relationship among the dependent variable FLTTRAINHRS and the independent variables MILFLTHRS and YEARSOUT. The regression lines show the relationship between FLTTRAINHRS and YEARSOUT for three levels of MILFLTHRS: 300 hours, 1,650 hours, and 3,000 hours. It can be seen that, as would be expected, FLTTRAINHRS increase as a function of YEARSOUT and decrease as a function of MILFLTHRS. The regression lines show that one hour of flight time is required to offset the effect of every two years away from active duty flying. For instance, for a given level of MILFLTHRS, an aviator who had been away from active duty flying for eight years required two more hours of flight training than an aviator who had been away from active duty flying for four years. The vertical distance between the three regression lines indicate the extent to which flight-training-hour requirements are reduced by prior active

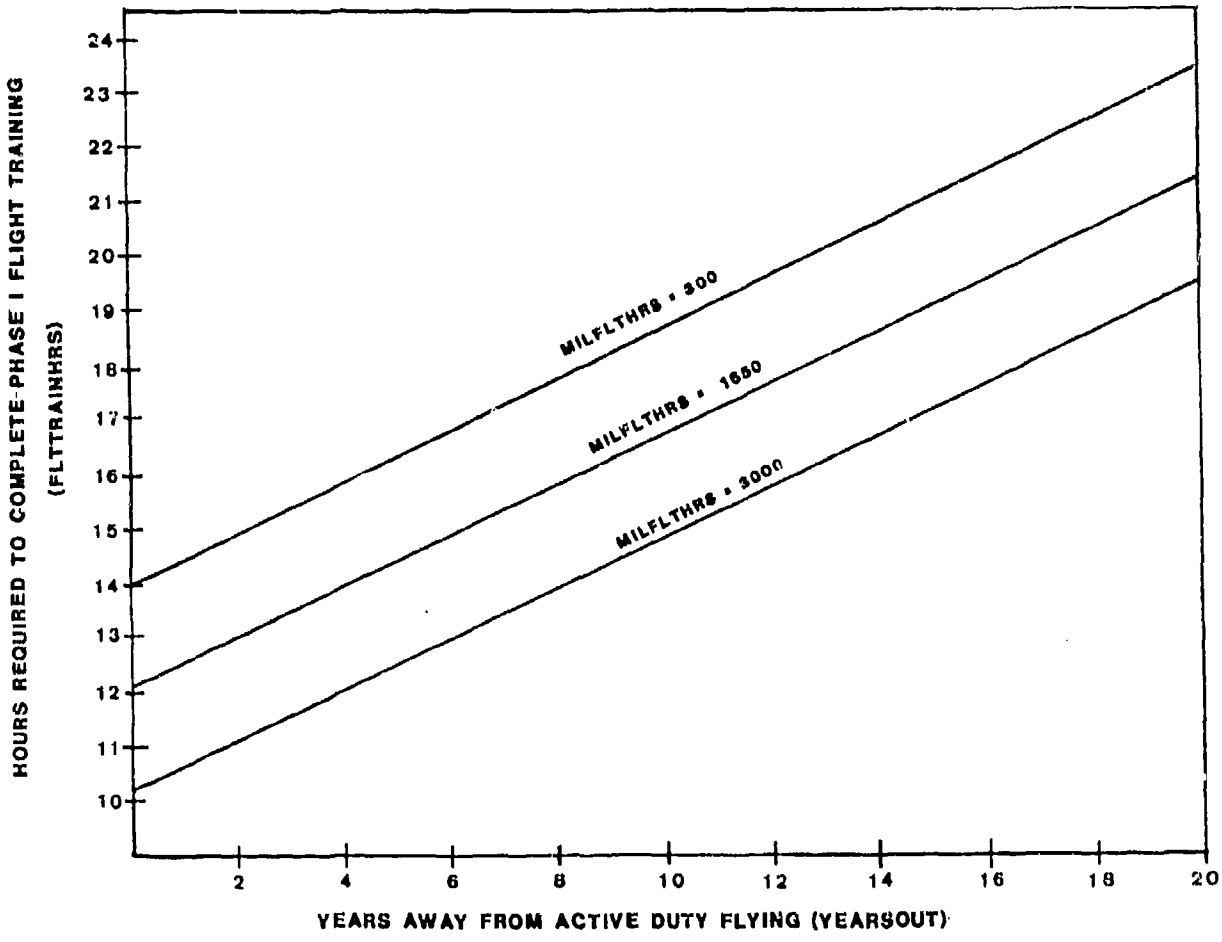


Figure 6. Relationship between FLTTRAINHRS and YEARSOUT for three levels of MILFLTHRS.

duty flying experience. The curves show that, for a constant number of YEARSOUT, 666 MILFLTHRS reduce by one hour the number of aircraft hours required to complete Phase I flight training.

The results of the analysis of time to complete flight training have three significant implications for training managers. First, if a lock-step training program is desired in which all aviators are required to complete a minimum number of flight hours, approximately 24 hours of flight training are necessary to ensure that 95% of all IRR aviators complete Phase I flight training. In contrast, a self-paced program, which provides the aviator with only the minimum flight training necessary to complete Phase I flight training, will require an average of 16 flight hours per aviator, representing an average savings of eight flight hours per aviator.

Second, the results suggest that resources devoted to training can be reduced somewhat by selecting aviators who have recently left the active Army and who have higher levels of flight experience. The regression equation can be used to estimate the resources that would be saved by any aviator selection strategy. Alternately, these factors could be used to select reserve aviators to provide maximum rates of buildup of qualified aviators in the event of a major mobilization.

Third, the results suggest that the regression equation could serve as a useful tool for fiscal planning and allocation of resources. Given knowledge about the MILFLTHRS and YEARSOUT of the IRR aviators to be trained, a unit commander can easily use the regression equation to estimate the aircraft hours and IP time needed to accomplish the training.

Number of Practice Iterations to Regain Proficiency

The previous subsection discussed the amount of flight time required to regain flight proficiency. This subsection presents information about how the flight time was spent. Specifically, data are presented on the number of practice iterations that IRR aviators required to regain proficiency on each of a selected set of the psychomotor tasks on which IRR aviators were trained.[9] For this analysis, an IRR aviator was judged to have regained proficiency on a task when his performance on the task was rated satisfactory (a rating of 6 or above) by the IP on two consecutive flights, or when the IRR aviator passed the Phase I checkride.

It seems reasonable for IPs and training managers to ask whether initial checkride rating is indicative of the number. To examine this relationship, three correlations are presented in Table 19. Significant correlations were found between the median[10] number of practice iterations required to regain proficiency on a task and two other measures: (1) the mean initial checkride rating on that task ($r = -.36$, $p < .05$), and (2) the mean training flight number on which training commenced on that task ($r = -.71$, $p < .001$). No relationship was found between these two measures ($r = .02$, $p > .05$).

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[9]Iteration data were not collected for procedural tasks because practice iterations in the cockpit are not a reliable index of the time spent in mastering procedural tasks. That is, mastery of procedural tasks is heavily dependent upon the use of documents, hand-written lists, and other mnemonics. In addition, iteration data were not collected for the following frequently performed psychomotor tasks: Perform Straight-and-Level Flight, Perform Climb and Descent, Perform Turns, and Perform Traffic Pattern Flight.

[10]The distribution of practice iterations is highly skewed (positively), so the median is a more meaningful measure of central tendency than the mean.

TABLE 19

CORRELATIONS AMONG MEDIAN PRACTICE ITERATIONS, MEAN INITIAL CHECKRIDE RATINGS, AND MEAN TRAINING FLIGHT ON WHICH TRAINING BEGINS FOR PSYCHOMOTOR FLIGHT TASKS (N = 25)

	MEAN INITIAL CHECKRIDE SCORE	MEAN TRAINING FLIGHT ON WHICH TRAINING BEGINS
MEDIAN PRACTICE ITERATIONS	-0.36*	-0.71**
MEAN INITIAL CHECKRIDE SCORE	1.00	0.02

*p <.05
**p <.001

Data helpful in interpreting the correlations are presented in Table 20. The left-hand column lists the names of the flight tasks for which iteration data were collected. The tasks are listed in rank order; the median number of practice iterations required to regain proficiency was used to rank order the tasks. The second column shows the value of the median number of iterations for each task. The third column shows the mean initial checkride score. The fourth and final column shows the mean training flight on which training was initiated.

The significant negative correlation between practice iterations and mean initial rating indicates that, in general, the lower the initial checkride rating on a task, the larger the number of practice iterations required to regain proficiency on that task. However, the relationship is as strong as might be expected (r = -.36). Table 20 shows that there are exceptions to the negative relationship between iterations and initial checkride rating. Most of the exceptions are hovering tasks that received more practice iterations than would be anticipated by their initial checkride rating. This may be due in part to when training commences on a task, discussed below.

Surprisingly, there is no relationship between initial checkride rating and when training on a task commences. In other words, IPs do not begin training the tasks that are best performed by aviators upon arrival at the training site and then proceed through the poorly performed tasks. Examination of Table 20 shows that practice on some tasks that were rated as poorly performed during the initial checkride commenced early in training; whereas, practice on some tasks that were rated relatively high commenced later in training. In most instances, practice on the two tasks rated lowest--Standard Autorotation and Antitorque Malfunction--was initiated on training flights one and two, respectively. Practice for two highly rated tasks, Slope Operation and High Reconnaissance, began on training flight six. Apparently, training does not always proceed from the easiest to the most difficult task to perform, but rather, tasks of varying difficulty are trained from the outset.

TABLE 20
PRACTICE ITERATIONS REQUIRED TO ACHIEVE PROFICIENCY
ON SELECTED FLIGHT TASKS COMPARED WITH MEAN INITIAL CHECKRIDE
RATINGS AND TRAINING FLIGHT ON WHICH TRAINING COMMENCED ON TASK

FLIGHT TASKS	MEDIAN NUMBER OF PRACTICE ITERATIONS (N = 47)	MEAN INITIAL CHECKRIDE RATING*	MEAN TRAINING FLIGHT ON WHICH TRAINING COMMENCED (N = 47)
Antitorque Malfunction	15.3	3.00	2.26
Standard Autorotation	14.7	3.27	1.30
Normal Takeoff	13.3	4.33	1.00
Hovering Autorotation	11.3	4.33	1.77
Hover Turn	10.7	4.70	1.00
Takeoff to a Hover	10.0	4.65	1.00
Low Level Autorotation	9.4	3.57	1.00
Landing From a Hover	8.5	5.03	1.00
Simulated Max Takeoff	6.9	4.26	1.00
Hovering Flight	6.3	4.90	1.00
Normal Approach	6.0	4.33	1.00
Hover Power Check	5.5	4.31	1.00
Hydraulic Failure	5.3	3.79	1.81
Engine Failure Altitude	3.7	4.18	3.40
Engine Failure Hover	3.6	4.53	2.94
Steep Approach	3.6	4.31	2.51
Slope Operations	3.5	4.79	6.15
High Reconnaissance	3.5	4.58	6.00
Shallow Approach	3.2	4.37	3.06
Manual Throttle Operations	3.0	3.97	4.60
Confined Area Operations	2.3	4.44	6.17
Go-Around	2.2	4.58	5.15
Pinnacle/Ridgeline	2.1	4.48	6.55
Deceleration/Acceleration	1.9	4.55	4.94
Vertical IFR Recovery	1.3	3.50	7.09

*See Table 16 for the size N on which mean initial checkride rating is based.

Although no correlation exists between when training commences on a task and initial checkride score, a strong correlation exists between when training commences on a task and the number of iterations required to regain proficiency. Tasks that are practiced early in training required more iterations than tasks that are practiced later in training. As was stated above, most of the tasks for which there is not a negative relationship between practice iterations and initial checkride score are hovering tasks, which received more practice iterations than would be anticipated by their initial checkride scores.

A comparison of the two correlations calculated between iterations required to regain proficiency shows the day on which training commences is more highly related to iterations required to regain proficiency than the initial checkride score ($t = 2.25$, $p < .05$). This result indicates that when a task is trained is a better indication of the practice iterations required to regain proficiency than is the initial skill level of the task.

What do these results suggest to the training manager and IP concerning the practice required to regain proficiency? First, when a task is trained is a better indication of practice required to regain proficiency than initial performance. This result suggests a generalization of training from tasks practiced early in training to tasks practiced later in training. So, IPs can anticipate that any task practiced early in training will require many practice iterations. Students should be counseled that tasks trained early may be difficult to reacquire; however, later tasks will "come back" to them quickly with little practice. This is true of even the most difficult tasks. Finally, the training manager can anticipate that aviators with lower initial checkride scores will require more practice iterations on the whole than aviators with high initial checkride scores. However, the tasks that will receive these additional iterations required by aviators who score lower will be influenced greatly by the tasks selected by the IP to train first.

PHASE II TRAINING: FIRST TRAINING YEAR

Forty-five of the 47 IRR aviators completed Phase II academic training after completing Phase I academic training. Twenty-four of the 47 aviators also successfully completed Phase II flight training. The flight hours required to complete Phase II flight training varied from 1.0 to 9.1 hours; the average IRR aviator required 4.3 flight hours to complete Phase II flight training.

AVIATOR SUBJECTIVE EVALUATION OF THE REVISED TRAINING PROGRAM: FIRST TRAINING YEAR

Forty-six aviators completed questionnaires asking them to evaluate both the academic and inflight portions of the questionnaire. A copy of the questionnaire is presented in Appendix C; a complete listing of responses is presented in Appendix D.

Responses to selected questions about the aviators' acceptance of the training are summarized in Table 21. The majority of the aviators indicated that the reference material, study guide, and unit quizzes either adequately or more than adequately helped prepare them for the oral portion of their checkrides. Eighty-eight percent agreed that the study guide adequately prepared them for the unit quizzes. Ninety-six percent indicated that the unit quiz items are of the correct

difficulty. Eighty percent judged that the self-study approach is as good as or better than the lecture approach.

Seventy-one percent judged that, upon completion of the IRR refresher training, they were more proficient at flying than when they completed flight school. Ninety-eight percent indicated that the program was adequate or more than adequate as a reserve officer training program.

TABLE 21

PERCENT OF AVIATORS RESPONDING IN EACH CATEGORY OF SELECTED QUESTIONS CONCERNING PHASE I TRAINING

QUESTION	N	MORE THAN ADEQUATELY	ADEQUATELY	SOME	NOT AT ALL	
1. DID THE SELECTED REFERENCE MATERIAL HELP PREPARE YOU FOR THE ORAL PORTION OF THE PHASE I CHECKRIDE?	44	32	34	27	7	
2. DID THE STUDY GUIDE HELP PREPARE YOU FOR THE ORAL PORTION OF THE PHASE I CHECKRIDE?	44	20	39	41	0	
3. DID THE UNIT QUIZZES HELP PREPARE YOU FOR THE ORAL PORTION OF THE PHASE I CHECKRIDE?	46	24	61	15	0	
4. DID THE STUDY GUIDE ITEMS PREPARE YOU FOR THE UNIT QUIZZES?	43	44	40	14	2	
	N	TOO SIMPLE	ABOUT RIGHT	TOO DIFFICULT		
5. HOW DIFFICULT WERE THE QUESTIONS ON THE UNIT QUIZZES?	46	0	96	4		
	N	BETTER THAN LECTURE PRESENTATION	AS GOOD AS LECTURE PRESENTATION	NOT AS GOOD LECTURE PRESENTATION		
6. HOW WOULD YOU COMPARE THIS SELF-PACED TRAINING STRUCTURE TO LECTURE PRESENTATION?	45	53	27	20		
	N	MUCH MORE PROFICIENT THAN WHEN YOU FINISHED FLIGHT SCHOOL	MORE PROFICIENT THAN WHEN YOU FINISHED FLIGHT SCHOOL	AS PROFICIENT AS WHEN YOU FINISHED FLIGHT SCHOOL	LESS PROFICIENT THAN WHEN YOU FINISHED FLIGHT SCHOOL	MUCH LESS PROFICIENT THAN WHEN YOU FINISHED FLIGHT SCHOOL
7. UPON COMPLETING THIS PROGRAM, HOW PROFICIENT ARE YOU AT FLYING?	43	37	34	19	7	3
	N	MORE THAN ADEQUATE	ADEQUATE	FAIR	POOR	
8. HOW WOULD YOU RATE THIS PROGRAM AS A TRAINING PROGRAM FOR RESERVISTS?	46	9	89	2	0	

SECTION V: RESEARCH METHOD--SECOND TRAINING YEAR

This section describes the research method employed during the second training year. With only a few exceptions, the research methods used in the second training year are the same as those described for the first training year. To avoid unnecessary repetition, only those methods that differ from the first training year are described here.

SUBJECTS

Twenty-four of the 47 aviators trained during the first training year returned for the second training year. All 47 aviators who participated in the first training year were contacted four months prior to training to determine if they could participate in the second training year. Twenty-four of the 47 aviators were available for training one year (± one month) from the completion of the first training period. Most of the remaining 23 aviators were unable to participate either because of civilian job conflicts or because they had joined other reserve units.

The military rank of the 24 aviators who served as subjects is shown in Table 22. The time that had elapsed since they had last flown as an active Army aviator, prior to the first training year, ranged from two years to 12 years, with a median of 9.3 years. Fifteen of the aviators had been qualified in instrument flight when on active duty.

TABLE 22

MILITARY RANK OF IRR AVIATORS TRAINED:
SECOND TRAINING YEAR

RANK	NO. OF AVIATORS
MAJ	1
CPT	6
CW3	12
CW2	5

The total hours that the IRR aviators had logged prior to participating in this evaluation ranged from 600 to 3,100 hours; the median was 1,213 hours. Table 23 shows (a) the types of aircraft in which the IRR aviators had logged time, and (b) the median and range of hours logged in each type aircraft.

A comparison of the military demographic data for aviators trained in the first and second training years does not suggest that the groups differ enough to anticipate differences in performance.

TABLE 23

HOURS FLIGHT EXPERIENCE IN ARMY AIRCRAFT OF IRR AVIATORS TRAINED: SECOND TRAINING YEAR

AIRCRAFT TYPE	NUMBER OF IRR AVIATORS	MEDIAN FLIGHT HOURS	RANGE OF FLIGHT HOURS
UH-1	24	859	150-1800
AH-1	7	250	30-2800
OH-58	14	106	25- 600
CH-47	1	1000	1000
OTHER	24	152	40-1000

INSTRUCTOR PILOTS

All flight training during this evaluation was conducted by three of the four highly experienced IPs who served as IPs during the first training year. Two IPs were active-duty Army IPs, and the third was a civilian contract IP who previously had been an active-duty Army IP.

TRAINING-CLASS SCHEDULE

The training-class schedule is shown in Table 24. One training class was conducted each month from June 1983 through November 1983. The class size ranged from two to six IRR aviators.

TABLE 24

NUMBER OF IRR AVIATORS TRAINED EACH MONTH: SECOND TRAINING YEAR

MONTH	DATES	NO. OF AVIATORS
JUNE	6-24	4
JULY	11-29	6
AUGUST	8-26	3
SEPTEMBER	12-30	5
OCTOBER	3-21	4
NOVEMBER	10-31 - 11-18	2

TRAINING PROCEDURES

With only a few exceptions, the training procedures used during the second training year were the same as those described in Section II; the exceptions are described below.

Mail Reference Materials and Study Guide

The first 14 academic study units and reference materials were mailed to the aviators about five weeks prior to their scheduled arrival at the training site. The last academic unit, Unit 15, was provided to the aviators upon completion of the first 14 units at the training site. All aviators received the materials no less than four weeks before they reported for their on-site training.

Academic Training

Academic training was conducted as described in Section II, with aviators completing the self-instruction materials at a rate commensurate with their skills and motivation. Upon completing Phase II academics, aviators were asked to view at least two of the last four MITAC lessons (described in Section III). Because of the poor quality of the imagery on the 8-mm film used in the TEC version of the MITAC, the MITAC course has been eliminated from the proposed training program and, therefore, is not discussed in Section III.

Flight Training

As described in Section II, flight training was self-paced. Flight performance was evaluated during each flight as in the first training year. One ATM task (#4010, "Describe and/or Perform Emergency Procedures") that had been evaluated as a psychomotor task during the first training year was evaluated as a procedural task during the second training year. In other words, the number of omissions for this task were recorded rather than a rating on the seven-point scale discussed earlier (pp. 42-43). All remaining tasks were evaluated in the same manner as the first training year.

During the first training year, aviators received training on ATM Task #4006, "Perform Simulated Anti-Torque Malfunction." Between the first and second year training, iteration requirements for this task were removed from the ATM. For this reason, no aviators received instruction on Anti-Torque Malfunction during the second training year.

SECTION VI: RESULTS OF SECOND TRAINING YEAR

This section presents the results of the second training year. In reviewing these results, it is important that the reader keep in mind that the main purpose of continuing this research for a second year was to compile empirical data on a) the knowledge and skill decay that occurs during one year with no practice, and b) the training time IRR aviators require to regain the level of knowledge and skill achieved during the first training year. Contrasting the results of the first and second year provides valuable insight about the effectiveness of the current IRR aviator training strategy: one 19-day retraining session each year. This issue is discussed in more detail in the next and final section of the report: Section VII.

EVALUATION OF ACADEMIC TRAINING

This section compares the first year academic performance to that of the second year. Mailing the home-study materials to IRR aviators earlier the second year resulted in a substantial increase in the amount of home-study completed prior to on-site training. Increased home-study, in turn, had a major influence on the on-site training time devoted to academic training. For that reason, the amount of home-study will be discussed first. A comparison of initial knowledge levels will be discussed next, followed by a comparison of the time required to complete academic training. The discussion of academic training will conclude with a comparison of post-training knowledge levels.

Willingness to Complete Home-Study

Prior to the second year of on-site training, home-study materials were mailed to aviators early enough to permit them four weeks to complete the study units. This was two to three weeks more time than was provided the first year. When interviewed during on-site training, the second training year aviators reported that four weeks was adequate time to complete the study guides. Additional time, they reported, would not have resulted in the completion of additional units. So, the number of study units completed prior to the second training year represents an accurate estimate of the number of units IRR aviators are willing to complete prior to training. The additional time resulted in roughly twice as many home-study units being completed the second training year than the first.

Figure 7 shows, for each training year, the percent of aviators who each year completed one unit, two units, ..., 14 units during home-study. It can be seen that approximately the same percentage of aviators each year completed one, two, five and six units. The first year shows a higher completion rate than the second for three and four units. However, the greatest difference between the two years is the proportion of aviators who completed seven or more units. The first

year curve shows a precipitous decrease between six and seven units; whereas, the second year curve shows a gradual decreasing percentage. The precipitous decrease for the first year and the gradual decrease the second year supports the aviators' assertion that they required more time for home-study than was available the first training year.

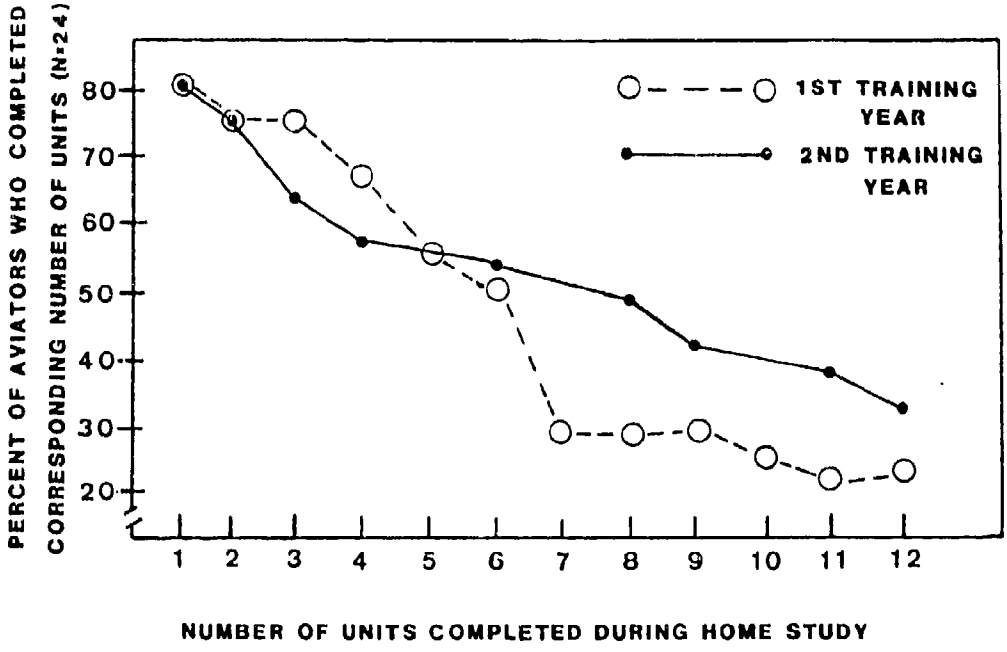


Figure 7. Home-study units completed by IRR aviators.

It should be noted that 20% of the aviators did not complete any home-study either year. However, the failure to complete home-study is not necessarily an indication of a lack of motivation; some of the most highly motivated and successful aviators completed no home-study units prior to training. In these instances, civilian life style, usually a demanding occupation, limited the time the IRR aviator was able to devote to home study.

Pretraining Level of Academic Knowledge

To examine subtest differences between the first and second years, means and standard deviations were calculated on individual subtests for those who did not complete home-study. Scores on the diagnostic examination are not valid indicators of pretraining knowledge for IRR aviators who engaged in home-study, so these were excluded from the analysis.

Table 25 shows, for each training year, the mean and standard deviation for each subtest on the diagnostic examination. "NA" is entered for topics that were not tested and trained the first training year. As can be seen in Table 25, two-thirds of the scores are higher the second year than the first. However, only Aerodynamics, Night Vision, and Operating Limits show a positive increase in pretraining knowledge of 10% or more. Four subtests show a small decrease in pretraining knowledge: Introduction to UH-1 Operator's Manual, Basic Instruments, Regulations and Publications, and Aeromedical Factors. None of the scores decreased more than 7%.

TABLE 25

PERCENT CHANGE IN MEANS OF DIAGNOSTIC SUBTEST SCORES FOR AVIATORS WHO DID NOT COMPLETE HOME-STUDY

SUBTEST	2ND YEAR			1ST YEAR			% CHANGE FROM 1ST TO 2ND YEAR
	$\bar{X}$	SD	N	$\bar{X}$	SD	N	
INTRODUCTION TO THE OPERATOR'S MANUAL	75	18	6	79	22	20	-5
ATM FAMILIARIZATION	48	18	7	42	23	21	+6
WEIGHT AND BALANCE	64	34	17	NA	NA	NA	NA
PERFORMANCE PLANNING CARD	46	27	16	NA	NA	NA	NA
NORMAL PROCEDURES	82	12	10	79	23	21	+3
OPERATING LIMITS	58	14	10	48	20	23	+10
EMERGENCY PROCEDURES	65	05	10	57	12	26	+8
BASIC INSTRUMENTS	76	16	12	83	18	27	-7
REGULATIONS AND PUBLICATIONS	57	12	11	61	11	32	-4
AERODYNAMICS	69	08	12	56	14	33	+13
AEROMEDICAL FACTORS	59	12	14	65	18	33	-6
NIGHT VISION	59	19	14	48	18	32	+11
NIGHT FLIGHT TECHNIQUES	70	16	15	65	21	34	+5
TERRAIN FLIGHT	79	10	14	72	18	34	+7
MAP INTERPRETATION	42	15	23	NA	NA	NA	NA

To evaluate the overall difference in the level of pretraining academic knowledge, a total percent correct score on the initial diagnostic examination was calculated for the first and second training years. Only scores for the subtests of the common 12 academic units were included in the percent correct calculation. To evaluate mean differences on the diagnostic examination for the two training years, a one-way repeated measures analysis of covariance was conducted using numbers of home-study units completed prior to training as covariates. Home-study units completed prior to training were used as covariates because first year results indicated a strong relationship between academic performance and number of study units completed. The number of units completed prior to the first year was used as a covariate for the diagnostic examination score for the first training year, and the number of units completed prior to the second training year was used as a covariate for the diagnostic examination score for the second training year. Since the number of units completed during the first training year was collected for six of the aviators, the sample size for the covariance analysis was 18.

The number of study units completed prior to training was found to be significantly related to the diagnostic examination score ($F[1,16] = 9.41$, $p < .01$). The mean diagnostic examination scores for the first and second training years, adjusted for the number of study units completed, differed significantly ($F[1,16] = 4.54$, $p < .05$). However, as shown in Table 26, the adjusted mean score for the second training year (72%) is only five percentage points greater than the adjusted mean score for the first training year (67%). This finding is consistent with that for the individual subtest scores, discussed above.

TABLE 26

ANALYSIS OF COVARIANCE OF DIAGNOSTIC EXAMINATION SCORE

SOURCE OF VARIANCE	ADJUSTED SS	df	MS	F
DIAGNOSTIC EXAMINATION SCORE	0.023	1	0.023	12.35*
COVARIATES	0.040	1	0.040	21.29**
ADJUSTED MEANS Year One 0.72 Year Two 0.67				

*p <.05
**p <.01

These results show that a substantial amount (almost 67%) of the requisite academic knowledge is retained by "first-year" IRR aviators--aviators who, on the average, left active duty about nine years prior to commencing IRR aviator training. One year after being trained to criterion (over 90%), the retention level was only five percentage points greater. This finding clearly indicates that most of the knowledge decay that is going to occur will occur during the first training year. Stated differently, the academic knowledge decay rate is far larger the first year without review than the years following the first.

Days Required to Complete Academic Training

Table 27 shows, for each year, the mean and standard deviation for a) the days required to complete academic training, and b) the number of home study units completed prior to training. As can be seen, the time required to complete academic training the second training year was reduced to approximately two-thirds of that required the first training year. However, as was discussed earlier, the average number of home study units completed the second training year is approximately twice the average number completed the first training year. Hence, as is discussed below, the savings in academic training time can largely be attributed to the increase in home study.

TABLE 27

MEANS AND STANDARD DEVIATIONS FOR THE DAYS REQUIRED TO COMPLETE ACADEMIC TRAINING AND THE NUMBER OF HOME-STUDY UNITS COMPLETED PRIOR TO TRAINING

		MEAN	STANDARD DEVIATION
FIRST YEAR	ACADEMIC TRAINING DAYS	6.5	2.02
	HOME-STUDY UNITS	3.0	4.51
SECOND YEAR	ACADEMIC TRAINING DAYS	4.3	1.61
	HOME-STUDY UNITS	6.9	5.65

For the first training year, significant correlations were found between the number of days required to complete academic training and (a) the number of academic units completed prior to training, and (b) the years an aviator had been away from active duty flying. Table 28 shows the intercorrelations among the variables: the number of days required to complete academic training for the second training year (ACADAY II), the number of study units completed prior to on-site training the second training year (UNITSCOMP II), and the number of years elapsed since the aviator left active duty, prior to the first training year (YEARSOUT).

TABLE 28

INTERCORRELATIONS AMONG
ACADAY II, UNITSCOMP II, YEARSOUT

	UNITSCOMP II	YEARSOUT
ACADAY II	-0.66*	0.22
YEARSOUT	-0.07	

*Significant at .001

In the first training year, YEARSOUT was found to be weakly related to the days required to complete academic training. In the second training year, YEARSOUT was not found to be related to the days required to complete academic training; the correlation coefficient of .22 between YEARSOUT and ACADAY II is not statistically significant. The difference between first and second year results can be attributed to two factors. First, academic training received the first training year eliminated the academic differences due to differing years away from active duty. Second, the sample size of the second year class was not large enough to demonstrate statistical significance for this weak relationship.

Analysis of the pretraining level of academic knowledge demonstrated a slight improvement from first to second training year. It would be anticipated that this increase in knowledge would, in turn, result in a slight decrease in training time. To evaluate the difference in academic training time for the two training years, an analysis of covariance was conducted using the number of study units completed prior to training as covariates. There were 12 academic units in Phase I academic training in the first training year; in the second training year, there were 13 academic units. As can be seen by comparing Tables 2 and 9, 11 of the units were trained both years. In the second training year, two additional units were included in Phase I academic training and one unit was removed and placed into Phase II academic training. So, when interpreting these results, it must be recalled that academic training differed slightly between the two training years. It should also be pointed out that the number of units completed during the first training year was not determined for six of the aviators. This resulted in a sample size of 18 for the analysis. With these qualifications, the results of the analysis of covariance are presented below.

As shown in Table 29, the number of units completed during home study was found to be significantly related to the days required to complete academic training ($F\ [1,16] = 9.41$, $p < .01$). The mean number of days required to complete academic training the first year was found to be significantly greater than the number of days required the second year ($F\ [1,16] = 4.54$, $p < .05$). However, as shown in Table 29, the mean

TABLE 29

ANALYSIS OF COVARIANCE OF PHASE I ACADEMIC TRAINING DAYS

SOURCE OF VARIANCE	ADJUSTED SS	df	MS	F
YEAR	9.91	1	9.91	4.54*
COVARIATES	25.64	1	25.64	9.41**
ADJUSTED MEANS Year One 5.63 Year Two 4.81				

*p <.05
**p <.01

difference after adjustment is small, .8 days. So, although the actual on-site academic training time the second year decreased to half of the previous year, it is clear that most of the time savings are due to increased home-study.

Post-Training Knowledge Level

As was true for the analysis of the first year data, the pass rate and average scores for the post-training paper-and-pencil examinations, and the pass rate for the oral examination were used as indicators of the knowledge level acquired from the second year academic study. The results show that the level of post-training academic knowledge remained high through the second training year. With three exceptions, every aviator was able to achieve a 90% score on every unit examination through self study. Two aviators required 30 minutes of remedial tutoring from a project IP to achieve the necessary level of knowledge on one topic. One aviator required tutoring on two topics. Therefore, when averaged across all aviators and academic topics, the pass rate on the paper-and-pencil examination for Phase I was 98.7% with self-study alone. This percentage is almost identical to that of the first training year (99.8%).

Table 30 shows, for each academic topic, the percent of IRR aviators who passed the diagnostic subtest and, for those who failed to pass the diagnostic subtest, the percent who passed the unit examination on the first and second attempt for both training years.

An examination of the pass rate for Quiz B on Table 30 reveals little difference in pass rate between the first training year and the second training year, with one exception. Approximately half of the aviators were required to take Quiz B for the Emergency Procedures unit during the second training year. This suggests that aviators did not

TABLE 30

PERCENT OF IRR AVIATORS WHO PASSED THE DIAGNOSTIC SUBTEST AND PERCENT WHO PASSED THE UNIT EXAMINATION ON FIRST/SECOND ATTEMPT (N = 24)

	% OF AVIATORS WHO PASSED DIAGNOSTIC EXAMINATION		% OF AVIATORS WHO PASSED QUIZ A		% OF AVIATORS WHO PASSED QUIZ B		TOTAL	TOTAL
SUBTEST	1ST YEAR	2ND YEAR	1ST YEAR	2ND YEAR	1ST YEAR	2ND YEAR	1ST YEAR	2ND YEAR
INTRODUCTION TO THE OPERATOR'S MANUAL	55	54	43	42	02	04	100	100
ATM FAMILIARIZATION	28	33	70	63	02	04	100	100
WEIGHT AND BALANCE	NA	42	NA	50	NA	04	NA	96
PERFORMANCE PLANNING CARD	NA	33	NA	59	NA	04	NA	96
NORMAL PROCEDURES	60	63	34	33	06	04	100	100
OPERATING LIMITS	15	29	85	67	00	04	100	100
EMERGENCY PROCEDURES	07	04	89	46	04	46	100	96
BASIC INSTRUMENTS	68	42	32	58	00	00	100	100
REGULATIONS AND PUBLICATIONS	04	17	92	71	04	08	100	96
AERODYNAMICS	07	21	89	75	02	04	98	100
AEROMEDICAL FACTORS	26	04	70	75	04	21	100	100
NIGHT VISION	09	25	82	63	09	13	100	100
NIGHT FLIGHT TECHNIQUES	03	33	70	67	00	13	100	100
TERRAIN FLIGHT	38	54	60	42	04	02	100	100
MAP INTERPRETATION	NA	00	NA	75	NA	25	NA	100

study Emergency Procedures as thoroughly the second year prior to taking Quiz A. Differences in pass rate for Quiz A for the remaining subtests can be attributed mainly to the pass rate of the diagnostic examination. The pass rate for the first six subtests remain basically the same. Increases in pass rate for the diagnostic examination subtests for the last six subtests can be attributed to the increase in the preparation of IRR aviators who completed the corresponding home-study units. Decreases in pass rate were found for two units: Basic Instruments and Aeromedical Factors. Basic Instruments pass rate was the highest of all subtests for the first year, so the decrease may be simple regression toward the mean. As described above, the study unit for Aeromedical Factors was revised between training years due to changes in the academic knowledge required by the pilot's oral examination. This revision increased the size of the unit and is likely responsible for the decrease in pass rate for the second training year.

The scores that best represent the quantitative estimate of the post-training level of academic knowledge achieved is the average score achieved on the paper-and-pencil examination (diagnostic subtest or unit examination) on which the 90% criterion was achieved. In Table 31, the scores for both training years are compared with the best quantitative estimate of pretraining level of academic knowledge; that is, the mean diagnostic subtest scores achieved by the IRR aviators who did not engage in home-study. The pretraining scores were discussed earlier (p. 62). There is little difference in post-training scores between the two training years, indicating that the level of knowledge attained following training was uniformly high both training years.

The final indicator of academic knowledge achieved is the pass rate for the oral examination. As in the first training year, academic training enabled every aviator to pass the oral examination administered as part of the Phase I checkride. Eighty-eight percent of the IRR aviators passed the oral examination on their first attempt; the remainder passed the oral examination on their second attempt.

EVALUATION OF FLIGHT TRAINING

In this subsection, the flight training results for the second training year are compared to those of the first training year. The flight training results are reported in three parts. The first part compares initial checkride performance on Phase I flight tasks; the second part compares the time required to regain proficiency on Phase I flight tasks; the third part compares the practice iterations required to regain proficiency on Phase I flight tasks.

Initial Proficiency on Phase I Flight Tasks

As was true for the first training year, none of the IRR aviators trained the second training year were sufficiently skilled to pass the

TABLE 31

INDICATORS OF PRE-TRAINING AND POST-TRAINING LEVEL OF ACADEMIC KNOWLEDGE--FIRST AND SECOND TRAINING YEARS

ACADEMIC TOPIC	MEAN SCORE PRETRAINING		MEAN SCORE POST-TRAINING	
	1ST YEAR	2ND YEAR	1ST YEAR	2ND YEAR
INTRODUCTION TO THE OPERATOR'S MANUAL	79	75	95	96
ATM FAMILIARIZATION	42	48	93	94
WEIGHT AND BALANCE	NA	64	NA	96
PERFORMANCE PLANNING CARD	NA	46	NA	96
NORMAL PROCEDURES	79	82	95	94
OPERATING LIMITS	48	58	95	96
EMERGENCY PROCEDURES	57	65	95	97
BASIC INSTRUMENTS	83	76	93	95
REGULATIONS AND PUBLICATIONS	61	57	95	93
AERODYNAMICS	56	69	95	95
AEROMEDICAL FACTORS	65	59	93	94
NIGHT VISION	48	59	95	93
NIGHT FLIGHT TECHNIQUES	65	70	95	96
TERRAIN FLIGHT	72	79	96	95
MAP INTERPRETATION	NA	42	NA	94

proficiency flight evaluation administered prior to Phase I flight training. Table 32 shows descriptive statistics for first and second training year ratings or omissions for each task assessed during the evaluation. The statistics are based on the 24 IRR aviators who participated in both training years.

On the average, IPs rated the initial skill level of psychomotor tasks 0.80 higher the second training year than the first. The rating of every psychomotor task was rated higher the second training year; the increase in performance ranged from 0.26 to 1.57. Similarly, the number of omissions for every procedural task was fewer the second training year; the decrease in omissions ranged from 1.17 to 2.58.

The range of ratings and omissions on flight tasks following one year of no training suggests that the skills required to maintain the different tasks decay at different rates. All tasks were trained to proficiency; however, after a year of no training, psychomotor task

TABLE 32

MEANS AND STANDARD DEVIATIONS FOR THE INITIAL CHECKRIDE
(N = 24)

RANK ORDER	TASK	FIRST TRAINING YEAR M	FIRST TRAINING YEAR SD	SECOND TRAINING YEAR M	SECOND TRAINING YEAR SD
	Psychomotor Tasks[a]				
1	Standard Autorotation	3.50	1.50	4.29	1.27
2	Low Level Autorotation	3.77	1.48	4.50	1.29
3	Hydraulic Failure	3.90	1.48	4.67	1.13
4	Manual Throttle Opns	4.00	1.07	5.57	0.68
5	Hover Power Check	4.26	1.45	5.32	1.13
6	Simulated Max Takeoff	4.26	0.93	5.13	0.85
7	Shallow Approach	4.33	1.09	5.37	0.50
8	Hovering Autorotation	4.40	1.27	5.44	0.66
9	Steep Approach	4.44	0.98	5.29	0.75
10	Normal Approach	4.50	0.83	5.50	0.66
11	Engine Failure Hover	4.53	1.18	5.83	0.89
12	Takeoff to a Hover	4.55	1.00	5.71	0.62
13	Normal Takeoff	4.60	0.88	5.83	0.57
14	Pinnacle/Ridgeline Opns	4.69	1.32	5.12	1.05
15	Hovering Turn	4.70	0.98	5.88	0.45
16	Engine Failure Altitude	4.75	1.18	5.12	1.17
17	Confined Area Opns	4.78	1.09	5.25	0.79
18	Hi Reconnaissance	4.86	1.23	5.27	0.83
19	Decel/Accel	4.92	0.79	5.40	0.82
20	Slope Operations	4.92	0.95	5.75	0.74
21	Hovering Flight	4.95	1.10	5.71	0.38
22	Traffic Pattern	5.00	0.86	5.26	0.92
23	Climbs/Descents	5.11	0.81	5.79	0.51
24	Turns	5.16	0.83	5.83	0.48
25	Straight/Level Flight	5.21	0.79	5.71	0.55
26	Go-Around	5.27	0.91	5.67	0.73
27	Landing From a Hover	5.29	0.92	6.04	0.36
	Procedural Tasks[b]				
1	Prepare PPC	4.69	0.48	2.86	1.73
2	Use Performance Charts	4.69	0.48	2.87	1.69
3	Preflight Inspection	4.56	0.63	3.39	1.70
4	Radio Procedures	4.55	1.01	2.00	2.20
5	Plan VFR Flight	4.53	0.80	2.50	1.99
6	Weight & Balance Form	4.44	0.53	2.50	1.72
7	After Landing Check	4.08	1.51	1.50	1.69
8	Before Landing Check	3.67	1.85	1.25	1.51
9	Fuel Management Proc.	3.54	2.15	2.21	1.87
10	Before Takeoff Check	3.39	2.12	1.10	1.74

[a]Rated from "1" (lowest) to "7" (highest)
[b]Rated from "5" (lowest) to "0" (highest)

ratings were found to range from 5.29 to 6.04 and procedural task omissions ranged from 3.39 to 1.10.

Proficiency evaluation ratings for the first and second years were found to be highly correlated. The correlation coefficient was .73 ($p < .001$) for psychomotor tasks and .78 ($p < .004$) for procedural skills. In other words, the tasks that were poorly performed after two to 12 years of no practice tended to be the same tasks that were poorly performed after one year of no training. Similarly, the tasks that were performed well prior to the first training year tended to be performed well after a year of no training.

Flight Hours Required to Regain Proficiency on Phase I Flight Tasks

Between the first and second training years, a moratorium was placed on the performance of Task #4006, "Perform Simulated Anti-Torque Failure." As can be seen from the first year results in Table 16, this task was the most poorly performed task on the initial checkride and required the most practice iterations to regain proficiency. Therefore, a decrease in hours to regain proficiency was anticipated for all aviators. Estimates by project IPs suggest a one- to three-hour saving for each aviator due to the elimination of this task.

The time required to complete Phase I flight training is described in terms of the aircraft hours needed to complete (a) the proficiency flight evaluation, (b) inflight training on Phase I tasks, and (c) the Phase I checkride. The total IP time expended on Phase I flight training can be estimated by multiplying the flight hours by two. That is, the IP spent about one hour on table talk and administrative duties for each hour logged in the aircraft.

Table 33 presents correlation among flight training hours required to complete Phase I the second training year (FLTTRAIN II), the years the aviators have been away from active duty flying prior to the first training year (YEARSOUT), and the aviators' total military flight hours (MILFLTHRS). The correlations found for FLTTRAIN II, YEARSOUT, and MILFLTHRS are similar but not identical for both training years. A significant relationship between MILFLTHRS and FLTTRAIN II was found for the second training year, as was found during the first training year. In the first training year, however, YEARSOUT was found to be weakly related to the hours required to complete flight training. In the second training year, YEARSOUT was not found to be related to the hours required to complete academic training. The difference between first and second training year can be attributed to two factors. First, flight training received the first training year eliminated the flight proficiency differences due to differing years away from active duty among aviators. Second, the sample size of the second year class was not large enough to demonstrate a significant effect for this weak relationship. The difference found between the first and second year correlations is probably due to a combination of these factors.

TABLE 33

CORRELATIONS AMONG FLTTRAIN II, YEARSOUT, AND MILFLTHRS

	YEARSOUT	MILFLTHRS
FLTTRAIN II	.08	-.45*
YEARSOUT		.13

*p <.01.

Table 34 presents summary statistics for the flight hours required to complete Phase I flight training for the 24 aviators trained in both training years. It can be seen that, on the average, the IRR aviators trained the second year required 2.4 hours less time to complete Phase I flight training and pass a checkride. To determine if there is a statistically significant difference between mean flight training time, an analysis of covariance was conducted using MILFLTHRS as a covariate. MILFLTHRS was used as a covariate to remove the differences among aviators due to flight experience. Results of the analysis are shown in Table 35. MILFLTHRS was found to be significantly related to the hours required to complete flight training (approximate F [1,22] = 8.14, p <.01). The mean flight hours for the two training years were found to significantly differ (F[1,23] = 7.68, p <.01).

TABLE 34

MEANS AND STANDARD DEVIATIONS FOR FLIGHT HOURS REQUIRED TO REGAIN PHASE I FLIGHT SKILLS FOR THE 24 AVIATORS TRAINED BOTH YEARS

	MEAN	STANDARD DEVIATION
FIRST TRAINING YEAR	16.2	3.44
SECOND TRAINING YEAR	13.8	3.95

TABLE 35

ANALYSIS OF COVARIANCE OF PHASE I FLIGHT TRAINING HOURS

SOURCE OF VARIANCE	ADJUSTED	df	MS	F
YEAR	67.69	1	67.69	7.68*
MILFLTHRS	115.76	1	115.76	8.14*

*p <.01

The results of the analysis indicate that it is unlikely that the savings is due to chance. This difference can be attributed partly to the increase in pretraining proficiency prior to the second training year, as demonstrated by the higher pre-training proficiency flight evaluation scores found for year two (described above). However, the decrease in time is also partly due to the elimination of the task, "Perform Simulated Anti-Torque Malfunction."

The flight training results for the two training years provide useful information about the retention or, conversely, the decay of flying skills. The results of the first training year clearly show that IRR aviators retained a substantial amount of flying skill despite not having flown for a considerable period--about nine years on the average. The average aviator required only 16.2 hours to regain proficiency on all Phase I flying tasks, far fewer flight hours than a novice aviator requires to achieve an equivalent level of skill. However, the second year results show that, after one year without practice, only 2.4 fewer flight hours were required to achieve criterion performance than the first year. So, although a substantial portion of flying skills are retained over a number of years, most of the skill decay that is going to occur will have occurred by the end of the first year without practice.

Practice Iterations Required to Regain Proficiency on Phase I Tasks

In Table 36 are presented the correlations among initial checkride ratings, mean number of practice iterations, and flight number on which training commenced. As in the first training year, a weak negative correlation was found between practice iterations and mean initial checkride rating, indicating that, in general, the lower the initial checkride rating on a task, the larger the number of practice iterations required to regain proficiency on that task. However, the relationship is relatively weak ($r = -.36$, $p < .05$).

TABLE 36

CORRELATIONS AMONG MEDIAN PRACTICE ITERATIONS, MEAN INITIAL CHECKRIDE RATINGS, AND MEAN FLIGHT ON WHICH TRAINING BEGINS FOR PSYCHOMOTOR FLIGHT TASKS (N=24)

	MEAN INITIAL CHECKRIDE RATING	MEAN FLIGHT ON WHICH TRAINING BEGINS
MEDIAN PRACTICE ITERATIONS	-.36*	-.65**
MEAN INITIAL CHECKRIDE RATING		.04

*p <.05
**p <.001

As in the first training year, there is no relationship between initial checkride score and when training on a task commences. IPs do not begin training the tasks that are best performed by aviators upon arrival at the training site and then proceed through the poorly performed tasks. Examination of Table 37 shows that practice on some tasks that were rated as poorly performed during the initial checkride commenced early in training; whereas, practice on some tasks that were rated relatively highly commenced later in training. Hence, results of both training years indicate that training does not proceed from the easiest to the most difficult to perform task.

Strong correlations exist for both training years between when training commences on a task and the number of iterations required to regain proficiency. Tasks that are practiced early in training require more iterations than tasks practiced later in training. This finding is consistent across both training years.

TABLE 37

PRACTICE ITERATIONS REQUIRED TO ACHIEVE PROFICIENCY ON SELECTED FLIGHT TASKS COMPARED WITH MEAN INITIAL CHECKRIDE RATINGS AND TRAINING FLIGHT ON WHICH TRAINING COMMENCED ON TASK

FLIGHT TASKS	MEDIAN NUMBER OF PRACTICE ITERATIONS (N=24)	MEAN INITIAL CHECKRIDE RATING*	MEAN TRAINING FLIGHT ON WHICH TRAINING COMMENCED (N=24)
Standard Autorotation	12.5	4.29	1.1
Normal Takeoff	10.8	5.83	1.0
Low Level Autorotation	10.5	4.50	1.3
Simulated Max Takeoff	9.5	5.13	1.0
Hovering Autorotation	8.5	5.44	1.5
Takeoff to a Hover	7.2	5.71	1.0
Hover Turn	6.5	5.88	1.0
Landing From a Hover	6.2	6.04	1.0
Hydraulic Failure	6.0	4.67	1.3
Normal Approach	5.7	5.50	1.0
Slope Operations	4.5	5.75	3.5
Steep Approach	4.0	5.29	1.1
High Reconnaissance	4.0	5.27	3.5
Confined Area Operations	3.3	5.25	3.5
Deceleration/Acceleration	3.3	5.40	2.1
Engine Failure Altitude	3.2	5.12	2.2
Manual Throttle Operations	3.1	5.57	2.9
Shallow Approach	2.8	5.37	2.0
Go-Around	2.4	5.67	3.5
Engine Failure Hover	2.3	5.83	1.8
Pinnacle/Ridgeline	2.1	5.12	4.3

*The size N on which mean initial checkride rating averages 22.

Table 38 shows the correlations between the first and second years for three variables: initial checkride rating, median practice iterations, and flight number on which training commenced. As can be seen, all correlation coefficients are statistically significant and very large, indicating that the results are highly similar for both years. Tasks that were poorly performed on the initial checkride the first training year were poorly performed the second training year; tasks that were highly rated on the initial checkride for the first training year were highly rated the second training year. Tasks that required a high number of iterations the first training year required a high number the second year. Similarly, tasks that required few iterations the first year required few iterations the second year. Finally, it can be seen that the day on which training commenced on a task is highly correlated between training years. These results indicate that the training was extremely consistent for both training years.

TABLE 38

CORRELATIONS BETWEEN FIRST AND SECOND TRAINING YEAR FOR MEAN INITIAL CHECKRIDE RATING, MEDIAN ITERATIONS REQUIRED TO REGAIN PROFICIENCY, AND MEAN DAY ON WHICH TRAINING ON A TASK COMMENCED (N = 24)

	r
INITIAL CHECKRIDE RATING	.73*
ITERATIONS REQUIRED TO REGAIN PROFICIENCY	.93*
DAY ON WHICH TRAINING COMMENCED	.96*

*p <.00001

Phase II Training

All 24 IRR aviators completed Phase II academic training after completing Phase I academic training. Twenty-two of the 24 aviators also successfully completed Phase II flight training. The flight hours required to complete Phase II flight training varied from 2.0 to 9.9 hours; the average IRR aviator required 6.8 hours to complete Phase II flight training. In the first training year, aviators who completed Phase II flight training required an average of 4.3 hours. However, at the request of FORSCOM, one cross-country flight was included in Phase II training during the second training year. This additional flight is responsible for the increase of 1.5 hours required to complete Phase II flight training.

AVIATOR SUBJECTIVE EVALUATION OF THE REVISED POI

Twenty-four aviators completed questionnaires asking them to evaluate both the academic and inflight portions of the training. A copy of the questionnaire is presented in Appendix E; a complete listing of responses is presented in Appendix F.

Responses to selected questions about the aviators' acceptance of the training are summarized in Table 39. The majority of the aviators indicated that the reference material, study guide, and unit quizzes either adequately or more than adequately helped prepare them for the oral portion of their checkrides. Findings that are especially noteworthy are listed below:

- ninety-six percent agreed that the unit quizzes adequately prepared them for the oral examination;
- ninety-six percent indicated that the unit quiz items are of the correct difficulty;
- eighty-seven percent judged that the self-study approach is as good as or better than the lecture approach;
- eighty-one percent judged that, upon completion of the IRR refresher training, they were more proficient at flying than when they completed flight school; and
- ninety-six percent indicated that the program was adequate or more than adequate as a reserve officer training program.

TABLE 39

PERCENT OF AVIATORS RESPONDING IN EACH CATEGORY OF SELECTED QUESTIONS CONCERNING TRAINING: SECOND TRAINING YEAR

QUESTION	N	MORE THAN ADEQUATELY	ADEQUATELY	SOME	NOT AT ALL	
1. DID THIS MATERIAL HELP PREPARE YOU FOR THE ORAL PORTION OF THE PHASE I CHECKRIDE?	24	24	44	28	4	
2. DID THE UNIT QUIZZES HELP PREPARE YOU FOR THE ORAL PORTION OF THE PHASE I CHECKRIDE?	24	43	52	4	0	
	N	TOO SIMPLE	ABOUT RIGHT	TOO DIFFICULT		
3. HOW DIFFICULT WERE THE QUESTIONS ON THE UNIT QUIZZES?	24	0	96	4		
	N	BETTER THAN LECTURE PRESENTATION	AS GOOD AS LECTURE PRESENTATION	NOT AS GOOD LECTURE PRESENTATION		
4. HOW WOULD YOU COMPARE THIS SELF-PACED TRAINING STRUCTURE TO LECTURE PRESENTATION?	23	70	17	13		
	N	MUCH MORE PROFICIENT THAN WHEN YOU FINISHED FLIGHT SCHOOL	MORE PROFICIENT THAN WHEN YOU FINISHED FLIGHT SCHOOL	AS PROFICIENT AS WHEN YOU FINISHED FLIGHT SCHOOL	LESS PROFICIENT THAN WHEN YOU FINISHED FLIGHT SCHOOL	MUCH LESS PROFICIENT THAN WHEN YOU FINISHED FLIGHT SCHOOL
5. UPON COMPLETING THIS PROGRAM, HOW PROFICIENT ARE YOU AT FLYING?	24	55	36	9	0	0
	N	MORE THAN ADEQUATE	ADEQUATE	FAIR	POOR	
6. HOW WOULD YOU RATE THIS OVERALL PROGRAM AS A TRAINING PROGRAM FOR RESERVISTS?	24	80	16	4	0	

SECTION VII: DISCUSSION

This section of the report has two major subsections. The first subsection discusses the implications of the research findings for training management. The second subsection discussed the implications for mobilization planning.

IMPLICATIONS FOR TRAINING MANAGEMENT

Initial Skill Level of IRR Aviators

Training managers can be confident that IRR aviators will arrive at the training site with a considerable amount of academic knowledge and flying skills retained from their active duty experience, but that all will require some amount of both academic training and flight training to achieve the minimal level of proficiency established for IRR aviators. The magnitude of academic knowledge and flight skill deficiencies, and the amount of training required to eliminate the deficiencies, can be expected to vary considerably from one IRR aviator to another. The variability in initial knowledge and skill deficiencies can be attributed, in part, to the amount of time that has elapsed since the IRR aviator left active duty and the amount of experience the IRR aviator accumulated while on active duty. However, a large part of the variability must be attributed to other, as yet undefined, individual differences.

Academic Training

The results of this research leave no doubt that the requisite academic knowledge can be acquired through self-study alone. Only rarely will it be necessary to augment self-study with individual tutoring by an IP; and, when required, the necessary tutoring should consume only a small amount of IP time (one or two hours at most). The amount of on-site training time required to complete academic training can be expected to vary as a function of:

- the amount of home study the IRR aviator engaged in prior to arrival at the training site (both training years), and
- the amount of time elapsed since the IRR aviator left active duty (first training year).

Assuming no home study, it can be expected that the average IRR aviator will require about 6.3 days (four-hour self-study periods each day) to complete academic training the first year and about 5.6 days to complete academic training the second year. For the first training year, less on-site training time will be required by IRR aviators who have been away from active duty a shorter than average time and by IRR aviators who engage in home study. For the second training year, only home study is related to on-site training time; the more home study, the

less the on-site training time required. Assuming the completion of all home-study units, it can be expected that academic training can be completed by the average aviator in about 17 hours the first training year and 14 hours the second training year.

Training managers can use the prediction equation in Section IV (p. 41) to devise a more precise estimate of amount of on-site academic training time required for the first training year as a function of (a) the number of years since the IRR aviator left active duty, and (b) the number of home-study units completed. The following equation can be used to devise a more precise estimate of academic training time required the second training year as a function of number of home-study units completed.

$$Y = 5.62 - 0.66X$$

where:

Y = days required to complete academic training
X = home-study units completed

The training manager can expect that the relative difficulty of the training topics will remain very constant from the first to the second training years. That is, the academic topics found most difficult the first training year can be expected to be the same topics that are found most difficult the second training year.

At the outset of this project, there was considerable uncertainty about IRR aviators' willingness to voluntarily engage in home-study. Based upon the results of this study, training managers can be confident that most aviators will engage in a substantial amount of home-study if the home-study materials are received at least one month prior to their scheduled departure for on-site training. For instance, more than one-half of the aviators who participated in the second training year completed 8 of the 14 home-study units; nearly one-third completed all 14 home-study units.

It seems highly probable that IRR aviators could be induced to complete even more home-study if they were provided with some tangible incentives for doing so. It will be recalled that an opportunity to spend more time flying was the only incentive the IRR aviators in this study had for engaging in home-study. An investigation of the types and relative benefits of incentives for home-study is a research task that should be included in any future research on IRR aviator training.

In sum, this research has provided the training managers with an effective academic training program that can be used to train IRR aviators singly or in groups. The program limits IP requirements to actual flight training. The program is appropriate for a highly heterogeneous group of aviators, permitting them to complete training at a rate commensurate with their skills and motivation. This research has also provided the training managers with means for estimating training

requirements for IRR aviators with different demographic characteristics. Using this information, the training manager can estimate training costs and resource requirements before commencing the training of the IRR aviators for which he or she is responsible.

Flight Training

As was stated earlier, training managers can be confident that all IRR aviators will require some amount of flight training to achieve the established criterion for flight proficiency and that the amount of flight training required will vary considerably from one IRR aviator to another. However, all aviators can be expected to reacquire flying skills in far less time than was required to learn them initially. The average IRR aviator can be expected to complete Phase I training in about 16.2 flying hours the first training year and about 13.8 flying hours the second training year. Some IRR aviators can be expected to complete Phase II training the first training year, and all IRR aviators can be expected to complete Phase II training the second training year. The average IRR aviator can be expected to require about 6.8 flight hours to complete Phase II training the second training year.

During the first training year, the number of flight hours required to complete Phase I flight training can be expected to be positively correlated with the years elapsed since the aviator left active duty and negatively correlated with the number of flying hours logged while on active duty. During the second training year, the number of flight hours required to complete Phase I training can be expected to be correlated (negatively) only with the number of flight hours logged while on active duty. Training managers can use the regression equation shown on page 48 to compute a more precise estimate of the flight hours required to complete Phase I training the first training year (as a function of the number of years since the aviator has flown on active duty, and the number of flight hours accumulated while on active duty). The following regression equation can be used to compute a more precise estimate of the flight hours required to complete Phase II training the second training year (as a function of the number of flight hours accumulated while on active duty).

$$Y = 19.71 - .44X$$

Where:

Y = hours to complete Phase I flight training
X = total hours of military flight experience

Training managers can expect that the flying tasks on which the initial level of performance is low generally require the greatest number of practice iterations to regain proficiency. However, some exceptions to this relationship can be expected.

IMPLICATIONS FOR MOBILIZATION PLANNERS

There can be no doubt that the IRR aviator training program constitutes a highly cost-effective method for eliminating the aviator short fall that would exist in the event of a major mobilization. This research has shown that the IRR aviator training program can produce a proficient aviator (through retraining) in far less time than is required to produce a proficient aviator through the IERW program. To illustrate, the results have shown that an average IRR aviator requires only about 17 hours of flight training and about 40 hours of academic training (self-study) to reacquire contact flying skills. In contrast, about 75 hours of flight training and 200 hours of academic training (mostly classroom) are required by inexperienced IERW students to achieve a comparable level of knowledge and skill. Moreover, because of the additional experience the IRR aviators accumulated while on active duty, the average IRR aviator should be more effective on the battlefield than an IERW student with equivalent contact flying skills.

Savings in training time represent savings in training resources. Since flight training time and academic training time for an IRR aviator is one-fifth of that for an IERW student, it is not unreasonable to assume that the cost of training an IERW aviator would be roughly five time greater than the cost of training an IRR aviator. Therefore, to fulfill the manpower requirement of a major mobilization by training IERW graduates, who have on the average 1,000 fewer flying hours than IRR aviators, the cost to the Army will be five times greater than fulfilling the manpower requirement by training IRR aviators.

Costs, however, cannot be the only consideration in selecting a strategy to fulfill the manpower requirements of a major conflict. Success in a future conflict will be determined, in part, by how rapidly a response can be made to any hostility. More costly solutions to problems are often justified in order to achieve a decrease in response time. However, by training IRR aviators the Army can simultaneously reduce cost and response time. Because the number of students who can be taught at any one time is limited by the available facilities (classrooms, aircraft, etc.), this benefit is multiplicative. In other words, five IRR classes could be trained in the same amount of time that would be required to train a single IERW class. To put it in a more relevant way, in the first three months of a major conflict, the Army, using the resources at Fort Rucker, could train approximately 3,000 IRR aviators in contact and NOE flight tasks before a single student could be graduated from the IERW program.

These results suggest that, in the event of a major mobilization, the majority of Army aviation training resources should be dedicated to the retraining of IRR aviators.

A critical issue for mobilization planning is the cost-effectiveness of continued annual training of IRR aviators. The cost-effectiveness of a continuous annual training strategy is largely

dependent upon the extent to which academic knowledge and flying skills decay during the one-year period separating on-site training sessions. The results of the research shows that much of the knowledge/skill decay that is going to occur will have occurred by the end of one year without training. Stated differently, the results indicate that the amount of training required to reach a given level of proficiency is nearly as great the second training year as the first.

There is no question that, as a group, the IRR aviators who participated in both training years were more proficient after the second training year than after the first. For instance, all IRR aviators completed Phase II training the second year, while only 51 percent completed Phase II training the first training year. The question is whether the increased level of proficiency realized from the second training year is worth the cost. The same question can be posed for the third training year, the fourth training year, and so on.

An assessment of the cost-effectiveness of yearly training versus other training strategies is beyond the scope of this research. However, the magnitude of the knowledge and skill decay revealed by this research suggests that annual training of IRR aviators is an issue that warrants careful study by Army personnel who possess the information and expertise needed to do so. At the very least, the cost-effectiveness of an annual training strategy should be compared with (a) a strategy that provides more frequent training, and (b) a strategy in which IRR aviators are provided no training until a major mobilization becomes probable or imminent.

REFERENCES

Allnutt, M. F., & Everhart, C. D. (1980). Prototype training program for Individual Ready Reserve (IRR) UH-1 aviators (Working Paper FR-FU-80-10). Fort Rucker, Alabama: U. S. Army Research Field Unit.

Bickley, W. R. (1980). Optimizing simulator aircraft mixes. Proceedings of the Interservice/ITEC Conference. Salt Lake City, UT.

Department of the Army. (1980). Aircrew Training Manual: Commander's Guide (TC 1-134). Washington, D.C.

Department of the Army. (1981). Aircrew Training Manual: Utility Helicopter (TC 1-135). Baltimore, MD.

Everha· , C. D., & Allnutt, M. F. (1981). Training program for In ;idual Ready Reserve (IRR) UH-1 aviators. Phase I (revised) and Pha e II (Working Paper FR-FU-81-13). Fort Rucker, AL: U. S. Army Research Institute Field Unit.

Holman, G. L. (1979). Training effectiveness of the CH-47 flight simulator (Research Report 1209). Fort Rucker, AL: U. S. Army Research Institute Field Unit.

Johnson, K. R., & Ruskin, R. S. (1977). Behavioral instruction: an evaluative review. Washington, DC: American Psychological Association.

Keller, F. S. (1968). Goodbye Teacher. Journal of Applied Behavior Analysis, 1, 79-89.

Kulik, J. A., Kulik, C. C., & Cohen, P. A. (1979). A meta-analysis of outcome studies of Keller's personalized system of instruction. American Psychologist, 34(4), 307-318.

Mengelkoch, R. F., Adams, J. A, & Gainer, C. A. (1960). The forgetting of instrument flying skills as a function of the level of initial proficiency (NAVTRADEVCEN TR 71-16-18). Port Washington, NY: U. S. Naval Training Device Center.

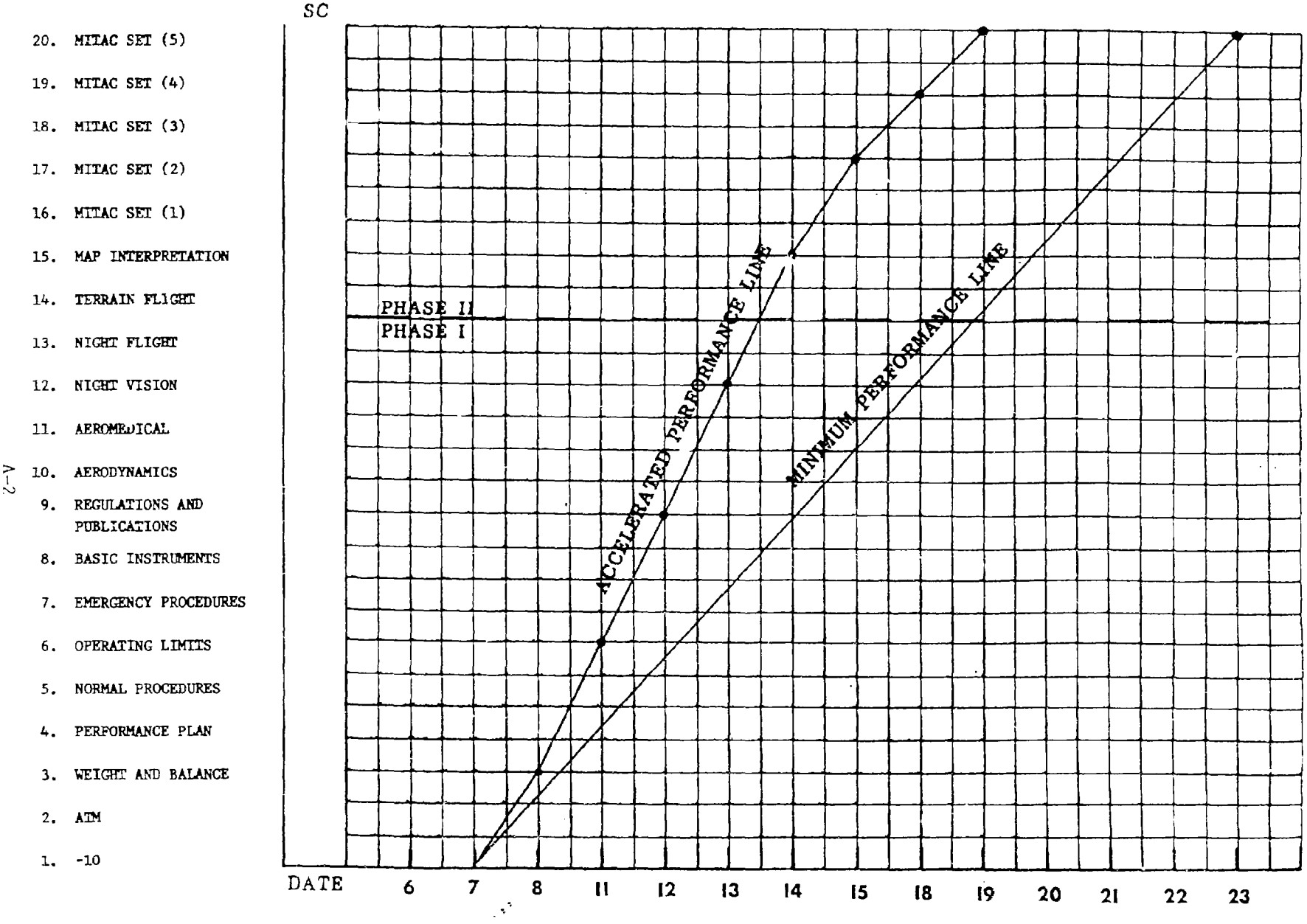
Prophet, W. W. (1976). Long-term retention of flying skills: a review of the literature (HumRRO Technical Report 76-35). Alexandria, VA: Human Resources Research Organization.

Smith, J. F., & Matheny, W. G. (1976). Continuation versus recurrent pilot training (AFHRL-TR-76-4). Brooks AFB, TX: Air Force Human Resources Laboratory.

Taveggia, T. C. (1976). Personalized instruction: A summary of comparative research, 1967-1974. American Journal of Physics, 44(11), 1028-1033.

A P P E N D I X A

DAILY ACADEMIC PROGRESS RECORD


SC
20. MITAC SET (5)
19. MITAC SET (4)
18. MITAC SET (3)
17. MITAC SET (2)
16. MITAC SET (1)
15. MAP INTERPRETATION
14. TERRAIN FLIGHT
13. NIGHT FLIGHT
12. NIGHT VISION
11. AEROMEDICAL
10. AERODYNAMICS
9. REGULATIONS AND PUBLICATIONS
8. BASIC INSTRUMENTS
7. EMERGENCY PROCEDURES
6. OPERATING LIMITS
5. NORMAL PROCEDURES
4. PERFORMANCE PLAN
3. WEIGHT AND BALANCE
2. ATM
1. -10
PHASE II
PHASE I
ACCELERATED PERFORMANCE LINE
MINIMUM PERFORMANCE LINE
DATE
6
7
8
11
12
13
14
15
18
19
20
21
22
23

A P P E N D I X B

INFLIGHT DATA COLLECTION FORMS

IRR INFLIGHT DATA COLLECTION FORM
PHASE I

NAME _____ SSN _____

RANK _____ DATE ____/____/____ IP _____

PURPOSE OF FLIGHT: CHK1 CHK2 TRNG PUT-UP: YES/NO FLIGHT #: _____

TOTAL FLIGHT TIME: _____HRS _____MIN WIND _____ DAY/NGT(*): _____

1. PLAN VFR FLT OMISSIONS: 0 1 2 3 4 +	11. NORM T/O* / R COMMENTS:
2. WT BAL FORM OMISSIONS: 0 1 2 3 4 +	12. DECEL/ACEL / R COMMENTS:
3. PERF CHARTS OMISSIONS: 0 1 2 3 4 +	13. BEFORE LANDING CHKS* OMISSIONS: 0 1 2 3 4 +
4. PREPARE PPC OMISSIONS: 0 1 2 3 4 +	14. NORM APP * / R COMMENTS:
5. PREFLT INSPECT* OMISSIONS: 0 1 2 3 4 +	15. LNDG FRM HOVER* / R COMMENTS:
6. BEFORE T/O CHKS * OMISSIONS: 0 1 2 3 4 +	16. SIM MAX T/O / R COMMENTS:
7. T/O TO HOVER* / R COMMENTS:	17. STEEP APP* / R COMMENTS
8. HOV POWER CHK* / R COMMENTS:	18. SHL APP / R COMMENTS:
9. HOV TURN* / R COMMENTS:	19. HYD FAIL / R COMMENTS:
10. HOV FLT* / R COMMENTS:	20. MAN THRT OPN / R COMMENTS:

21. ANTITRQ MALF / R
COMMENTS:

22. GO-AROUND / R
COMMENTS:

23. ENG FAIL ALT / R
COMMENTS:

24. ENG FAIL HOV / R
COMMENTS:

25. HOV AUTO* / R
COMMENTS:

26. STD AUTO* / R
COMMENTS:

27. L/L AUTO* / R
COMMENTS:

28. AUTO W/TURN / R
COMMENTS:

29. CONFD AREA OPNS / R
COMMENTS:

30. HI RECON / R
COMMENTS:

31. SLOPE OPNS / R
COMMENTS:

32. PIN/RDGLN OPNS / R
COMMENTS:

33. AFTER LNDG TSKS*
OMISSIONS: 0 1 2 3 4 +

34. VHIRP / R
COMMENTS:

35. RAD PROC
OMISSIONS: 0 1 2 3 4 +

36. CLIMB/DESCEND R
COMMENTS:

37. TURNS R
COMMENTS

38. STRT/LVL FLT R
COMMENTS:

39. FUEL MGT PROC
OMISSIONS: 0 1 2 3 4 +

40. TRAF PAT* R
COMMENTS:

41. EMERG PRO* R
COMMENTS:

42. CONTROL TOUCH R
COMMENTS:

43. SAFETY R
COMMENTS:

IRR VALIDATION/REVISION

MANEUVER RATING SCALE

RATING	DESCRIPTION
1	Performance unsafe to the extent that the IP immediately had to take control of the aircraft.
2	Performance deteriorated until IP was finally required to take control of the aircraft.
3	None of the ATM standards were met, student required considerable verbal assistance but maintained control of the aircraft.
4	Less than half of the ATM standards were met, student required some verbal assistance and frequently over-controlled.
5	More than half of the ATM standards were met, student required little or no verbal assistance, but tended to slightly over-control or accepted slight deviations without corrections.
6	All ATM standards were met, most deviations were quickly noticed and smoothly corrected.
7	All performance within IP standards (+ ATM standards), any deviations were small and immediately corrected.

IRR INFLIGHT DATA COLLECTION FORM

PHASE II

NAME_____ SSN_____

RANK_____ DATE___/___/___ IP_____

PURPOSE OF FLIGHT: CHK1 CHK2 TRNG PUT UP: YES/NO FLIGHT #:_____

TOTAL FLIGHT TIME: _____HRS _____MIN WIND_____DAY/NGT:_____

1. TER FLT BRIEFING OMISSIONS: 0 1 2 3 4 +	7. L/L FLIGHT / R COMMENTS:
2. OGE CHK / R COMMENTS:	8. CONTOUR FLT / / COMMENTS:
3. MASK/UNMASK (Hover) / R COMMENTS:	9. NOE FLT / R COMMENTS:
4. NOE DECEL / R COMMENTS:	10. TER FLT APP / R COMMENTS:
5. TER FLT T/O / R COMMENTS:	11. FM HOM / R COMMENTS:
6. TER FLT NAV / R COMMENTS:	

A P P E N D I X C

IRR AVIATOR FEEDBACK FORM

FIRST TRAINING YEAR

IRR AVIATOR FEEDBACK FORM

Please answer the following questions. Your constructive criticism will help us improve this program. All information will be treated confidentially. Thank you for your help.

REFERENCE MATERIAL

1. Approximately how much time did you spend reviewing the reference material at home?

   _____ hours.

2. Did the selected reference material help prepare you for the oral portion of the Phase I checkride? (check one)

   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

3. What additional topics, if any, would you include in the reference material to prepare you for the oral exam? _____

   _____

   _____

4. What additional reference material, if any, would you include to better prepare you for an oral exam? _____

   _____

   _____

5. What topics, if any, should be deleted from the existing reference material? _____

   _____

   _____

6. What material, if any, would you delete from the existing reference material? _____

   _____

   _____

REFERENCE MATERIAL (CONTINUED)

7. Use the following space to make any additional comments on the reference material. _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

STUDY QUESTIONS

1. Approximately how much time did you spend completing the study guide at home?

   _____ hours.

2. Did the study guide help prepare you for the oral portion of the Phase I checkride? (check one)

   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

3. Please list the topic areas, if any, where additional study guide items are needed. _____

_____

_____

4. Please list the topic areas, if any, where there are too many study guide items. _____

_____

_____

STUDY QUESTIONS (CONTINUED)

5. Did the study guide items help prepare you for the quizzes? (check one)

   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

6. Use the following space to make any additional comments on the study guide material. _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

UNIT QUIZZES

1. Did the unit quizzes help prepare you for the oral portion of the Phase I checkride? (check one)

   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

2. How difficult were the questions on the unit quizzes? (check one)

   [ ] too simple
   [ ] about right
   [ ] too difficult

UNIT QUIZZES (CONTINUED)

3. Which of the units, if any, require some reworking? _____

4. Which of the units, if any, covered too much material? _____

5. Which of the units, if any, covered too little material? _____

6. How would you compare this self-paced training structure to lecture presentation? (check one)

   [ ] not as good as lecture presentation
   [ ] as good as lecture presentation
   [ ] better than lecture presentation

7. Use the following space to make any additional comments on the unit quizzes. _____

TRAINING FILMS

1. Did the training films help prepare you for the oral portion of the Phase I checkride? (check one)

   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

2. For which topics, if any, would you add a training film? _____

3. Which of the training films, if any, would you delete from the training program? _____

4. Use the following space to make any additional comments on the training films. _____

MITAC TRAINING MATERIALS

1. Did the MITAC training materials help prepare you for NOE navigation? (check one)

   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

2. Use the following space to make any additional comments on the MITAC training materials.

TRAINING SCHEDULE

1. How would you change the order of the academic topics?

2. How would you change the schedule of academic and flight training?

3. Are there any other changes in the schedule you would have made?

TRAINING SCHEDULE (CONTINUED)

4. Use the following space to make any additional comments on the schedule of this training program. _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

IP PREPARATION FOR ORAL EXAM

1. Approximately how much time did an IP spend preparing you for the oral portion of the Phase I checkride?

_____ hours.

2. Please list the topics and an estimated amount of time the IP spent reviewing these topics with you. _____

_____

_____

3. How many times did you seek help from an IP on academic subjects?

_____ times

4. What problems, if any, did you experience in meeting with an IP when you needed assistance? _____

_____

_____

FLIGHT TRAINING

1. Do you feel that the flight training prepared you for your Phase I checkride? (check one)

   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

2. Did the Phase II flight training prepare you for the Phase II checkride? (check one)

   [ ] received no training
   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

3. What things, if any, would you change in the flight training?

   _____

   _____

   _____

4. Please use the following space to make any additional comments on the flight training. _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

2C35 AND SFTS TRAINING

1. Did training in the 2C35 help prepare you for your Phase I checkride? (check one)

   [ ] not at all
   [ ] some
   [ ] quite a bit

2. Did training in the SFTS help prepare you for your checkride? (check one)

   [ ] not at all
   [ ] some
   [ ] quite a bit

3. How much 2C35 training would you recommend for this program?

   _____ hours; _____ sessions.

4. How many hours and sessions of SFTS training would you recommend for this program?

   _____ hours; _____ sessions.

5. Please use the following space to make any additional comments on the 2C35 and SFTS training. _____

TOTAL PROGRAM

1. Upon completing this program, how proficient are you at flying? (check one)

   [ ] much less proficient than when you finished flight school
   [ ] less proficient than when you finished flight school
   [ ] as proficient as when you finished flight school
   [ ] more proficient than when you finished flight school
   [ ] much more proficient than when you finished flight school

2. What changes would you make in this program? _____

3. How would you rate this program as a training program for reservists? (check one)

   [ ] poor
   [ ] fair
   [ ] adequate
   [ ] more than adequate

4. Please use the following space to add any additional comments on the total training program. _____

A P P E N D I X D

RESPONSES TO IRR AVIATOR FEEDBACK FORM*

FIRST TRAINING YEAR

*The number of aviators responding to each item appears in brackets before the response.

REFERENCE MATERIAL

1. Approximately how much time did you spend reviewing the reference material at home?

[13]	0 Hours	[2]	8 Hours	[1]	19 Hours
[3]	1 Hour	[3]	10 Hours	[3]	20 Hours
[1]	2 Hours	[1]	11 Hours	[1]	24 Hours
[2]	3 Hours	[3]	12 Hours	[1]	25 Hours
[3]	4 Hours	[2]	15 Hours	[1]	26 Hours
[3]	5 Hours	[1]	18 Hours	[1]	40 Hours
[1]	6 Hours				

2. Did the selected reference material help prepare you for the oral portion of the Phase I checkride?

[2] blank
[3] not at all
[12] some
[15] adequately
[14] more than adequately

3. What additional topics, if any, would you include in the reference material to prepare you for the oral exam? (The number responding is shown in brackets.)

[10] blank
[18] None.
[2] AR 750-31.
[1] Complete -10.
[1] Local airspace usage.
[1] More emergency procedures.
[1] Direct reference to chapter--in ATM to use as study guide.
[1] It was very complete.
[1] The oral came right out of the ATM and the academics covered all of that.
[1] How to study.
[1] Complete -10 and complete FM 1-51.
[1] Basic a/c maintenance.
[1] There are enough topics now to keep me busy for a long time.
[1] Instrument flight.
[1] VHIRP procedures center pam 95-15.
[1] Let me have some study guides.
[1] Adequate.
[1] Make sure all changes to ATMs, -10s, etc. are in the folder.
[1] Original information would have worked if sent.

REFERENCE MATERIAL (CONTINUED)

4. What additional reference material, if any, would you include to better prepare you for an oral exam?

[10] blank
[22] None.
[2] 750-31.
[1] Permanent possession of publications (current).
[1] Sample oral exam.
[1] I think you gave us what we needed.
[1] Complete instrument flying handbook--flip flight planning handbook.
[1] Basic information on how to study.
[1] PPC, weight and balance.
[1] Highlight object of course and oral requirements.
[1] It is all there.
[1] Detailed material on the PPC card.
[1] Tell the people what they are to do.
[1] Adequate.
[1] A complete and up-to-date -10 and ATM.

5. What topics, if any, should be deleted from the existing reference material?

[11] blank
[22] None.
[1] Reduction on the physical study of the human eye.
[1] Night vision goggles have no bearing on preparing IRR aviators for active duty.
[1] Night vision.
[1] We had an overkill on night vision.
[1] Night vision section is a little too technical (medical terms); I agree we need to know about night vision but in more general terms.
[1] Units 6, 7, 9, 10, 11, 12.
[1] Details about night vision were very good but too detailed.
[1] Regulations and publications (except that the Army must think memorization of these is important).
[1] Night vision.
[1] I don't know.
[1] I don't know, I never got one.
[1] Aeromedical.
[1] 180° autorotation.

REFERENCE MATERIAL (CONTINUED)

6. What material, if any, would you delete from the existing reference material?

[14] blank
[26] None.
[1] Night vision goggles.
[2] Night vision.
[1] -10.
[1] I still don't know. I never got one.
[1] Aeromedical.

7. Use the following space to make any additional comments on the reference material.

[31] blank
[1] Advise the participants of the need to study the materials due to the pretest of academics and checkride.
[1] Include PPC programmed text with cargo charts.
[1] Overall, the reference material "package" was excellent.
[1] I thought the reference material was more than adequate, although I could have used more time to review the material more thoroughly.
[1] Need sooner and call from ARI.
[1] It was complete and indexed very well. I did not receive the material in time for enough study.
[1] Should include complete TC 1-20.
[1] Ref. material was good but too concentrated; for the amount of time given, we were saturated with information and at times it was too much. Example: The IP might want to emphasize limitations yet I'm studying night vision.
[1] There should be more specific items to study. Rather than examining the whole book to find the important data--for instance (this reference is on pgs 3-6 of the TM 1-51).
[1] The IPs are the best.
[1] Reference material was adequate.
[1] 1) Coming in cold gives you the best baseline for research info. 2) several typo errors in study guide.
[1] Had the reference material been received prior to arrival, the time needed to prepare for Phase I would have been reduced by several days.
[1] Material should be discussed in more lay terms.
[1] I would like to keep it.

STUDY QUESTIONS

1. Approximately how much time did you spend completing the study guide at home?

[11]	0 Hours	[1]	8 Hours	[1]	19 Hours
[2]	1 Hour	[3]	10 Hours	[4]	20 Hours
[2]	2 Hours	[1]	11 Hours	[1]	26 Hours
[3]	3 Hours	[6]	12 Hours	[1]	40 Hours
[4]	4 Hours	[2]	15 Hours	[1]	illegible
[2]	5 Hours	[1]	16 Hours		

2. Did the study guide help prepare you for the oral portion of the Phase I checkride?

[2] blank
[0] not at all
[18] some
[17] adequately
[9] more than adequately

3. Please list the topic areas, if any, where additional study guide items are needed.

[20] blank
[14] None.
[1] Instructor/equipment checking procedures.
[1] Local airspace and procedures.
[1] Map reading pract. exercises? Make study guide in 2 vols., Phase I and II.
[1] Emergency.
[1] Instruments.
[1] PPC - weight and balance.
[1] Aerodynamics.
[2] PPC card.
[1] Night vision - keys to learning the material.
[1] Need to distinguish real numbers from Fort Rucker training numbers.
[1] Night vision, aerodynamics.

STUDY QUESTIONS (CONTINUED)

4. Please list the topic areas, if any, where there are too many study guide items.

[23] blank
[15] None.
[3] Night vision.
[1] Night flight technique.
[1] Regulations and publications.
[1] Aeromedical.
[1] Appears comprehensive.
[1] I don't know.

5. Did the study guide items help prepare you for the quizzes?

[3] blank
[1] not at all
[6] some
[17] adequately
[19] more than adequately

6. Use the following space to make any additional comments on the study guide material.

[35] blank
[1] Neat to own permanently.
[1] Very good!
[2] Good.
[1] Study guide questions was an excellent review for oral exam and unit quizzes.
[1] Need film on aerodynamic basic explanation, or programmed text.
[1] Good but repetitious sometimes.
[1] The study guide material seemed comprehensive and at the minimum, adequate.
[1] Some questions were poorly written in aerodynamics.
[1] The study guide should be related to more specific pages in the text.
[1] Adequate.

UNIT QUIZZES

1. Did the unit quizzes help prepare you for the oral portion of the Phase I checkride?

   [0] blank
   [0] not at all
   [7] some
   [28] adequately
   [11] more than adequately

2. How difficult were the questions on the unit quizzes?

   [0] blank
   [0] too simple
   [44] about right
   [2] too difficult

3. Which of the units, if any, require some reworking?

   [13] blank
   [1] illegible.
   [5] None.
   [1] Aerodynamics; TC-135.
   [1] Night flying.
   [2] Regs and pubs.
   [1] Check spelling and typos on all.
   [1] See complain book.
   [1] Too many to list (at least 1 or 2 per unit).
   [1] Already discussed!
   [1] Complicated medical terms.
   [1] Aerodynamics.
   [1] Some questions in terrain and night flight are ambiguous.
   [1] Were pointed out.
   [1] Unit II.
   [1] Night vision, emer.
   [3] Night vision.
   [1] Night flight.
   [1] PPC.
   [1] The not questions were confusing.
   [1] Aerodynamics and aeromedical.
   [1] Night vision, aerodynamics.
   [1] Negative questions were confusing.
   [1] PPC & wt and bal.
   [1] Question 7 on weight and balance has no correct answer.
   [1] None in particular.
   [1] Should not use negative questions.

UNIT QUIZZES (CONTINUED)

4. Which of the units, if any, covered too much material?

[14] blank
[1] illegible
[13] None.
[1] O.K.
[1] Publications.
[9] Night vision.
[1] ATM, night vision.
[1] The night vision unit was all new so I learned a lot from it.
[1] Aeromed.
[1] Night vision, regs and pubs.
[1] Regs and pubs.
[1] Night vision and aerodynamics.

5. Which of the units, if any, covered too little material?

[23] blank
[1] illegible
[13] None.
[1] Ok.
[1] Normal procedures.
[1] Emergency and normal procedures.
[1] Emergency procedures.
[1] Performance planning - instruments.
[1] PPC; wt and bal.

6. How would you compare this self-paced training structure to lecture presentation?

[1] blank
[9] not as good as lecture presentation
[12] as good as lecture presentation
[24] better than lecture presentation

7. Use the following space to make any additional comments on the unit quizzes.

[35] blank
[2] None.
[1] Very good!
[1] Perhaps some lecture to help clarify certain points.
[1] Pre and post test too long. Approx. 200+ questions is too big a test. Long tests tend to be tiring and affect outcome.
[1] Reading at a self-pace program seems to be less effective than standard classes.
[1] Very good program.

UNIT QUIZZES (CONTINUED)

(Question 7 continued)

7. Use the following space to make any additional comments on the unit quizzes.

   [1] Prepare some programmed texts for the more difficult areas like PPC, night vision, and terrain flight that most older IRR were never exposed to before leaving the service.
   [1] Would like to see less multiple choice, more fill blanks (one or two word answer).
   [1] Again, if ample time and material had been provided prior to arrival, the training time needed could be reduced.
   [1] Should have an instructor teach classes as well as the self-study program.

TRAINING FILMS

1. Did the training films help prepare you for the oral portion of the Phase I checkride?

[8] blank
[5] not at all
[19] some
[10] adequately
[0] more than adequately
[3] Did not see.
[1] Training Center film, emergency procedures - all start-up.

2. For which topics, if any, would you add a training film?

[18] blank
[1] illegible
[3] None.
[1] Add night flight; terrain flight.
[1] Equip checks.
[1] Films are too slow.
[2] Emergency procedures.
[1] Engine start, runup, etc.
[1] Map reading.
[1] None - I never watched any.
[2] Preflight.
[2] Night vision.
[2] PPC, weight and balance.
[2] PPC.
[1] UH-1H systems, e.g., hydraulic, electrical, fuel, etc.
[1] Some films were not available.
[1] Night vision, night terrain.

3. Which of the training films, if any, would you delete from the training program?

[30] blank
[1] illegible
[9] None.
[1] All.
[1] Reduction of poor MITAC slide show.
[1] Did not review them all.
[1] I didn't see many.
[1] Aerodynamic films need to be updated.
[1] MITAC series.

TRAINING FILMS (CONTINUED) (CONTINUED)

4. Use the following space to make any additional comments on the training films.

[37] blank
[1] Did not utilize.
[1] Films are good.
[1] Films are very poor training aids; reason--eyes can read much faster than ears can listen.
[1] The training films and tapes on cockpit procedures were excellent, as was the instruction provided in that 4 hour block of instruction. However, I would recommend that it not be scheduled after a full day of classroom and flight activities.
[1] The preflight and runup films should be mandatory.
[1] Terrain flight tapes not realistic.
[1] I saw aerodynamics and preflight. Quality was not real good. Perhaps a video tape library to enhance or supplement study guide.
[1] The MITAC films are very difficult to see + as a result are very frustrating to try and use properly - poor color, poor contrast.
[1] No time available to view films, i.e., if you watched films, you couldn't study and take the required tests; if you studied and took tests, no time for films. Both preflight films were seen and helped greatly (however, not seen until 5th day).

MITAC TRAINING MATERIALS

1. Did the MITAC training materials help prepare you for NOE navigation?

   [3] blank
   [12] not at all
   [20] some
   [9] adequately
   [1] more than adequately
   [1] Did not use.

2. Use the following space to make any additional comments on the MITAC training materials.

   [30] blank
   [1] See above.
   [1] Poor quality.
   [1] We will get into that next year.
   [1] The films need to be viewed on a better screen, or be remade. It was very hard to identify the terrain features the film talked about.
   [1] The MITAC films aren't that valuable for an IRR aviator who has already been NOE qualified. They may be valuable for personnel not previously terrain flight qualified.
   [1] Material was developed at slow pace. Need better quality film, larger screen, poss. video disc. Use actual routes that will be flown.
   [1] Not very helpful - poor picture. No feedback - can't ask the machine questions.
   [1] Considering the constraints of the technology and space, I think they are helpful.
   [1] Films are faded to the point that much of the material is unusable.
   [1] Still did not understand NOE navigation.
   [1] The films are inadequate.
   [1] I didn't see all the films, but what I saw didn't help at all.
   [1] Not realistic.
   [1] Hard to see, clumsy, poor quality--need to start with basic map reading review, then advance. We hadn't read maps in 10 years either.
   [1] The MITAC films are <u>very</u> difficult to see and as a result are very frustrating to try and use properly--poor color, poor contrast.

TRAINING SCHEDULE

1. How would you change the order of the academic topics?

[20] blank
[6] None.
[4] No change.
[2] Not at all.
[2] Order is ok.
[1] NC.
[1] 1st normal and emer procedures should be studied first.
[1] PPC planning first.
[1] Emergency procedures need to be sooner.
[1] Change into two phases, I & II.
[1] More emphasis on units 3, 4, & 5.
[1] Good the way it was.
[1] I would probably spread the tests on a set schedule.
[1] Well scheduled.
[1] It was all right.
[1] Instrument should be last.
[1] Have night vision and night sit. before actually night flying.

2. How would you change the schedule of academic and flight training?

[19] blank
[5] None.
[4] No.
[2] Not at all.
[2] Schedule ok.
[1] 2 student per IP - 1 in morning, 1 in afternoon.
[1] Place more emphasis on completing academics before attendance (Rucker).
[1] NC.
[1] More academics before flight.
[1] Time them to occur concurrently.
[1] Too many things all at once.
[1] Try not to schedule late night class followed by morning class.
[1] I would not.
[1] Afternoon flying only.
[1] Early emphasis on academics was too great.
[1] More time for academics.
[1] Little bit longer lunch hour (15 min.) to not rush lunch--transportation.
[1] Have night vision and night sit. before actually night flying.

TRAINING SCHEDULE (CONTINUED)

3. Are there any other changes in the schedule you would have made?

[29] blank
[4] None.
[5] No.
[2] 1 day off mandatory.
[1] Slightly reduce load the first 1.5 weeks.
[1] Make a prearranged schedule and stick to it.
[1] Free time for the relief of stress.
[1] Possibly things could be scheduled a little more in advance.
[1] ok.
[1] Mostly good.

4. Use the following space to make any additional comments on the schedule of this training program.

[37] blank
[1] Better coordination of the schedule between the published and changed versions.
[1] Use free time as incentive.
[1] Let the IPs make the schedule.
[1] Totally disorganized! Members of this program did not know from hour to hour where they were supposed to be or what they were required to do. (No fault of the IPs, because they didn't know either.)
[1] Being such a condensed and intense program, try to alleviate late night SFTS periods.
[1] Too much.
[1] Do not schedule full day of flying, academic work plus night flying, followed by full day. Crew rest needed. One day off (possibly mandatory) needed at mid-course for crew rest.
[1] Not schedule day and night training periods on the same date.
[1] A clumsy gap exists if one finishes academics Phase I well before checkride and can't get into terrain flight academics.

IP PREPARATION FOR ORAL EXAM

1. Approximately how much time did an IP spend preparing you for the oral portion of the Phase I checkride?

[2]	blank	[9]	3 Hours	[1]	8 Hours
[2]	0 Hours	[3]	4 Hours	[5]	10 Hours
[4]	1 Hour	[4]	5 Hours	[1]	15 Hours
[9]	2 Hours	[1]	6 Hours	[1]	16 Hours

[1] He did not sit down to prepare me per se; he just did it as we trained from the first day.
[1] He was continuously preparing me whenever we were together.

2. Please list the topics and an estimated amount of time the IP spent reviewing these topics with you.

[16] blank
[1] Emergency procedures during flight.
[1] Operating limits - 1 hour; normal operations - .5; emergency procedures - 1.5.
[1] IPs used a continued approach and offered a great deal of help and preparation.
[1] Continuous training throughout entire course.
[1] All topics for the entire time we were here.
[1] Emergency procedures - 10 hours; preflight-runup-postflight - 4 hours; normal procedures - 2 hours.
[1] Reviewed all topics in the three hours time.
[1] 1) PPC; 2) crew briefings; 3) flight plan.
[1] All about equally.
[1] All topics discussed night before Phase I checkride--approximately 2 hours.
[1] Emergency procedures
[1] Aerodynamics--2 hours.
[1] Emergency procedures - 1 hour; operating limits - 1 hour; performance data - 1 hour; helicopter and system - 1 hour.
[1] PPC - 1.5 hours; aerodynamics - 3/4 hour, FARs - 3/4 hour.
[1] Each item listed in ATM
[1] Reviewed each topic once, some more than once.
[1] Mr. Everhart went over every portion of the oral to include each topic.
[1] Emergency procedures, operating limits
[1] Operating limits - .7 hour; emergency procedures - 1.3 hours, aerodynamics - .5 hour; aeromedical - .5 hour.
[1] Weather, operating procedures, etc.
[1] Aerodynamics - 1 hour; emergency procedures - 1 hour; flight characteristics - 30 minutes.
[1] All of the above.
[1] ATM standard for oral - complete review.
[1] VFR wx minimums - 10 minutes; weight and balance - 10 minutes; ATM - 30 minutes.

IP PREPARATION FOR ORAL EXAM (CONTINUED)

(Question 2 continued)

2. Please list the topics and an estimated amount of time the IP spent reviewing these topics with you.

[1] PPC - 1 hour; all other various amounts not tracked.
[1] IP integrated review and performance at flight line.
[1] All topics and questions--time split up over several days.
[1] Emergency procedures - 3 hours; tasks - 2/3 hour.
[1] IP went over all topics several times.
[1] Emergency procedures; ATMs procedures and requirements; map reading.

3. How many times did you seek help from an IP on academic subjects?

[5] blank
[3] None.
[4] 0
[4] 1
[8] 2
[3] 3
[3] 4
[1] 5
[1] 6
[1] 8
[5] 10
[1] Daily.
[1] All the time.
[1] When necessary.
[1] Occasionally.
[1] Whenever possible.
[1] Every day.
[1] Often!
[1] Some.

4. What problems, if any, did you experience in meeting with an IP when you needed assistance?

[6] blank
[40] None, never, no problem.

FLIGHT TRAINING

1. Do you feel that the flight training prepared you for your Phase I checkride?

   [0] not at all
   [0] some
   [17] adequately
   [29] more than adequately

2. Did the Phase II flight training prepare you for the Phase II checkride?

   [9] blank
   [6] received no training
   [0] not at all
   [8] some
   [15] adequately
   [8] more than adequately

3. What things, if any, would you change in the flight training?

   [24] blank
   [4] None.
   [1] NC.
   [2] Nothing.
   [1] More cross training with different IPs.
   [1] Add instrument instruction.
   [1] For 10 students and 3 IPs, the need for 2 nights of flying is apparent.
   [1] None - excellent program.
   [1] None except when Phase I and Phase II has been completed, there should be some follow-on training. I believe there is a schedule now that should correct the problem.
   [1] More IP debriefing and question and answer periods.
   [1] Eliminate the initial Phase I checkride.
   [1] More emphasis on field type training.
   [1] More time in the aircraft.
   [1] Give Phase I checkrides sooner.
   [1] Rotation through IPs.
   [1] More NOE.
   [1] Less work on technical work, more hands on.
   [1] Initially, perhaps a few more verbal reminders inflight or on approach rather than being distracted or behind aircraft and not utilizing to best opportunity to make most of 5 minutes in traffic pattern.
   [1] Instead of doing one or two of each maneuver per flight period, do enough repetitions of a few maneuvers to ensure student has complete understanding and proficiency.

FLIGHT TRAINING (CONTINUED)

4. Please use the following space to make any additional comments on the flight training.

[37] blank
[1] Excellent instructors, especially Langhammer.
[1] Ref. 3 above: It is almost impossible for 3 IPs to give adequate instruction (or orientation) in night flight in one night training period. With this number of students and IPs, two night periods should have been scheduled, 1/2 the first night; 1/2 the second night.
[1] Very good!
[1] Take into consideration that in real life, IPs will not be of the same quality as those available to ARI.
[1] Excellent.
[1] I did not progress to the checkride stage.
[1] Very comprehensive training.
[1] Make the IPs realize that we are qualified pilots with many flight hours that haven't flown in a long time. We are not new students, just rusty.
[1] I enjoyed it very much.

2C35 AND SFTS TRAINING

1. Did training in the 2C35 help prepare you for your Phase I checkride?

[0] blank
[4] not at all
[20] some
[22] quite a bit

2. Did training in the SFTS help prepare you for your checkride?

[1] blank
[11] not at all
[18] some
[16] quite a bit

3. How much 2C35 training would you recommend for this program?

[1]	blank	[2]	None.
[3]	1 hour, ___ sessions	[4]	2 hours, ___ sessions
[1]	3 hours, ___ sessions	[2]	4 hours, ___ sessions
[1]	___ hours, 1 session	[7]	1 hour, 1 session
[5]	2 hours, 2 sessions	[1]	3 hours, 1 session
[1]	___ hours, 2 sessions	[1]	1 hour, 2 sessions
[3]	2 hours, 2 sessions	[3]	3 hours, 2 sessions
[2]	4 hours, 2 sessions	[1]	4 hours, 3 sessions
[1]	6 hours, 3 sessions	[1]	3 hours, 4 sessions
[3]	8 hours, 4 sessions	[1]	1 hour, 5 sessions
[1]	10 hours, 5 sessions		

[1] Use it prior to flying, instead of wasting flight time trying to remember proper procedures.

4. How many hours and sessions of SFTS training would your recommend for this program?

[3]	blank	[5]	None.
[2]	2 hours, ___ sessions	[1]	3 hours, ___ sessions
[1]	4 hours, ___ sessions	[2]	6 hours, ___ sessions
[1]	10 hours, ___ sessions	[1]	15 hours, ___ sessions
[2]	1 hour, 1 session	[1]	3 hours, 1 session
[1]	___ hours, 2 sessions	[1]	1 hour, 2 sessions
[3]	2 hours, 2 sessions	[2]	3 hours, 2 sessions
[4]	4 hours, 2 sessions	[2]	6 hours, 2 sessions
[1]	3 hours, 3 sessions	[2]	4 hours, 3 sessions
[1]	5 hours, 3 sessions	[2]	6 hours, 3 sessions

2C35 AND SFTS TRAINING (CONTINUED)

(Question 4 continued)

4. How many hours and sessions of SFTS training would your recommend for this program?

[1] 9 hours, 3 sessions
[1] 6 hours, 4 sessions
[1] 10 hours, 5 sessions
[1] Got a lot out of both, especially SFTS.
[1] 1 hour, 4 sessions
[2] 8 hours, 4 sessions
[1] More.

5. Please use the following space to make any additional comments on the 2C35 and SFTS training.

[32] blank
[1] None.
[1] This class had severe scheduling problems with SFTS training.
[1] Maintenance on SFTS.
[1] The SFTS was down too often.
[1] Need contact UH-1 trainer. For visual and night, just like SFTS but not IFR.
[1] The sergeant who helped us on the 2C35, Sgt. Kroda (something like that) was very helpful and knows a great deal about the UH-1.
[1] SFTS was very good.
[1] SFTS is an excellent instrument training tool.
[1] An additional SFTS session could be helpful, especially with emergency procedures.
[1] It should be three phases: 1.5 hours normal procedures; 1.5 hours emergency procedures; 1.5 hours instrument procedures.
[1] Very good, need more.
[1] Emergency simulation in the SFTS gave me a greater degree of confidence in how to handle the aircraft.
[1] More scheduled 2C35 training would have aided in emergency procedures training and review.
[1] NCO did an outstanding job.

TOTAL PROGRAM

1. Upon completing this program, how proficient are you at flying?

[1] blank
[3] selected two responses
[0] much less proficient than when you finished flight school
[3] less proficient than when you finished flight school
[8] as proficient as when you finished flight school
[14] more proficient than when you finished flight school
[17] much more proficient than when you finished flight school

2. What changes would you make in this program?

[20] blank
[7] None.
[1] None - seemed very adequate.
[1] None. It is an excellent program.
[1] None - excellent program.
[1] None. An excellent course. The best flying training I have ever received.
[1] Very few.
[1] More organization in scheduling.
[1] More time (total).
[1] More advanced scheduling.
[1] I don't know.
[1] Schedule the academics to where it does not provide a time conflict.
[1] More emphasis on Units 3, 4, and 5.
[1] Less academics on the first day or two.
[1] Since the IPs have so much maintenance knowledge, we probably could have benefited from a "systems" class.
[1] Based on the program task, I find it to be more than adequate.
[1] 1 hour solo with IPs at least.
[1] Reduce IP involvement by having a class on cockpit procedure for all students at one time (reduce or eliminate IP for this instruction).
[1] Some programmed texts on more difficult subjects and putting high time/experience with medium and medium with low time to work together. Don't put high time with low on flight aspect as it may cause the low time pilot to feel inadequate when and (if) not progressing as fast. As an incentive factor for pre-study (this is done already I think) and for completing academic requirements and/or checkride, additional retirement points could be awarded to assist with obtaining good retirement years in the program.
[1] Those mentioned previously.
[1] Structured classroom time to concentrate on what is expected of you in the aircraft.

TOTAL PROGRAM (CONTINUED)

3. How would you rate this program as a training program for reservists?

[0] blank
[0] poor
[1] fair
[4] adequate
[40] more than adequate
[1] Excellent.

4. Please use the following space to add any additional comments on the total training program.

[30] blank
[1] I'm thankful for the program and its people. I thoroughly enjoyed these 19 days.
[1] Excellent program overall.
[1] Very professional IPs and good academic training. I do feel that 19 straight days (including weekends) without a break is too much. In our case, with 10 students and only 3 IPs, it could have possibly led to a stress and fatigue problem; not only with the students, but also for the instructors.
[1] I'm real pleased with my experience here, if that means anything.
[1] May have been too intense for the average reservist (through instruments).
[1] Solid program, and if the participants are motivated can be very productive.
[1] Is this program being implemented in field units with the same expertise as it is here.
[1] Excellent program--due largely to expertise, proficiency, and dedication of ARI staff. Question if all of these elements would or could be found in a field unit; leading to degradation in training program.
[1] Good job.
[1] Everybody and everything is and was super.
[1] I thought it was very good.
[1] None at this time.
[1] IP skills and professionalism demonstrated was better than any prior training received (even in flight school).
[1] I was impressed/motivated by the professionalism of individuals working for ARI who sought to ease disadvantages of time, experience, and civilian life in aviation retraining.
[1] The concept and application is very good.
[1] Study guide and materials necessary well in advance. Impractical to attempt to learn procedures in cockpit. Maximum proficiency much more possible when student understands maneuver before getting in cockpit and attempting to perform it.

A P P E N D I X E

IRR AVIATOR FEEDBACK FORM

SECOND TRAINING YEAR

IRR AVIATOR FEEDBACK FORM

Please answer the following questions. Your constructive criticism will help us improve this program. All information will be treated confidentially. Thank you for your help.

REFERENCE MATERIAL

1. Approximately how much time did you spend reviewing the reference material and completing the study guide at home?

   _____ hours.

2. Did this material help prepare you for the oral portion of the Phase I checkride? (check one)

   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

3. What additional topics, if any, would you include in this material to prepare you for the oral exam? _____

4. What topics, if any, should be deleted from the existing reference material? _____

5. Use the following space to make any additional comments on the reference material. _____

UNIT QUIZZES

1. Did the unit quizzes help prepare you for the oral portion of the Phase I checkride? (check one)

   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

2. How difficult were the questions on the unit quizzes? (check one)

   [ ] too simple
   [ ] about right
   [ ] too difficult

3. Which of the units, if any, require some reworking? _____

4. Which of the units, if any, covered too much material? _____

5. Which of the units, if any, covered too little material? _____

6. How would you compare this self-paced training structure to lecture presentation? (check one)

   [ ] not as good as lecture presentation
   [ ] as good as lecture presentation
   [ ] better than lecture presentation

7. Use the following space to make any additional comments on the unit quizzes. _____

TRAINING FILMS

1. Did the training films help prepare you for the oral portion of the Phase I checkride? (check one)

   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

2. For which topics, if any, would you add a training film? _____

   _____

   _____

3. Which of the training films, if any, would you delete from the training program? _____

   _____

   _____

4. Use the following space to make any additional comments on the training films. _____

   _____

   _____

   _____

MITAC TRAINING MATERIALS

1. Did the MITAC training materials help prepare you for NOE navigation? (check one)

   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

2. Use the following space to make any additional comments on the MITAC training materials. _____

   _____

   _____

   _____

FLIGHT TRAINING

1. Do you feel that the flight training prepared you for your Phase I checkride? (check one)

   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

2. Did the Phase II flight training prepare you for the Phase II checkride? (check one)

   [ ] received no training
   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

3. Did the night training using the light attenuating filters prepare you for your night checkride? (check one)

   [ ] received no training
   [ ] not at all
   [ ] some
   [ ] adequately
   [ ] more than adequately

4. If provided a choice, would you have rather <u>trained</u> at night or with the filters? Why?_____

5. What things, if any, would you change in the night flight training?_____

6. Please use the following space to make any additional comments on the flight training._____

2C35 AND SFTS TRAINING

1. Did training in the 2C35 help prepare you for your Phase I checkride? (check one)

   [ ] not at all
   [ ] some
   [ ] quite a bit

2. Did training in the SFTS help prepare you for your checkride? (check one)

   [ ] not at all
   [ ] some
   [ ] quite a bit

3. How many hours and sessions of 2C35 training would you recommend for this program?

   _____ hours; _____ sessions.

4. How many hours and sessions of SFTS training would you recommend for this program?

   _____ hours; _____ sessions.

5. Please use the following space to make any additional comments on the 2C35 and SFTS training. _____

   _____

   _____

   _____

   _____

TOTAL PROGRAM

1. Upon completing this program, how proficient are you at flying? (check one)

   [ ] much less proficient than when you finished flight school
   [ ] less proficient than when you finished flight school
   [ ] as proficient as when you finished flight school
   [ ] more proficient than when you finished flight school
   [ ] much more proficient than when you finished flight school

2. What changes would you make in this program? _____

3. How would you rate this program as a training program for reservists? (check one)

   [ ] poor
   [ ] fair
   [ ] adequate
   [ ] more than adequate

4. Please use the following space to add any additional comments on the total training program. _____

A P P E N D I X F

RESPONSES TO IRR AVIATOR FEEDBACK FORM*

SECOND TRAINING YEAR

*The number of aviators responding to each item appears in brackets before the response.

REFERENCE MATERIAL

1. Approximately how much time did you spend reviewing the reference material at home?

[1]	0 Hours	[2]	10 Hours	[2]	25 Hours
[1]	1 Hour	[1]	14 Hours	[1]	30 Hours
[2]	2 Hours	[2]	15 Hours	[1]	40 Hours
[1]	3 Hours	[1]	16 Hours	[1]	50 Hours
[4]	4 Hours	[1]	20 Hours	[1]	80 Hours

2. Did the selected reference material help prepare you for the oral portion of the Phase I checkride?

[1] not at all
[7] some
[10] adequately
[6] more than adequately

3. What additional topics, if any, would you include in the reference material to prepare you for the oral exam?

[6] blank
[11] None.
[1] More in-depth emergency procedures - also more on runup.
[1] Insert on night vision with layman explanations.
[1] Chapters 3 and 4, -10.
[1] Suggest challenge answer when using flash cards - use Stick Buddy on other person.
[1] Material presented was adequate for the oral portion.
[1] Systems description and function, map interpretation.
[1] Map interpretation.

4. What topics, if any, should be deleted from the existing material?

[1] MITAC films - voice tape is good - change MITAC system for VTR of local area.
[1] Memorizing Chapter #s that are in an index is unnecessary.
[1] -10 and ATM - a handout as a reference should be enough.
[1] Not delete but reduce amount of Aeromedical.
[1] Less Aeromed.

REFERENCE MATERIAL (CONTINUED)

5. Use the following space to make any additional comments on the reference material.

[12] blank
[1] N/A
[1] Need info on local procedures, i.e., frequency, corridor, flight plans!, etc.
[1] 1. Map interpretation addition - 100% better than last year Phase II packet. Good addition.
2. Flash cards excellent idea.
[1] There was a lot of material for the allotted time before arriving for training.
[1] Memorizing chapter #s that are in an index is unnecessary.
[1] Addition of PPC and weight and balance programmed texts were excellent and helped greatly in preparing for this year's tour.
[1] Too time intensive. Narrative answers waste time that could be productively used in evaluating and understanding desired points.
[1] Heat and cold injuries.
[1] Because of address problems, I received the materials very close to the time of starting the program.
[1] Threat brief.
[1] Excellent, well prepared.
[1] Had not much time to spend on it. Was unsure of whether I would come to the program pending flight physical.

UNIT QUIZZES

1. Did the unit quizzes help prepare you for the oral portion of the Phase I checkride?

   [0] not at all
   [1] some
   [13] adequately
   [10] more than adequately

2. How difficult were the questions on the unit quizzes?

   [0] too simple
   [22] about right
   [1] about right - too many questions are too wordy; example: "Which of the following statements is false?" followed by half a page of answers. This type of question is especially bad in pretests and posttests.
   [1] too difficult

3. Which of the unit quizzes, if any, require some reworking?

   [6] blank
   [6] None.
   [3] Night vision.
   [2] Weight and Balance.
   [1] Weight and Balance, PPC.
   [1] PPC.
   [1] Aerodynamics.
   [1] Aeromedical.
   [1] Too many questions are too wordy. Example: "Which of the following statements is false?" followed by half a page of answers. This type of question is especially bad in pretests and posttests.
   [1] Ones which have not responded to changes.

4. Which of the units, if any, covered too much material?

   [13] blank
   [12] None.
   [1] N/A.
   [4] Aeromedical.
   [1] Aeromedical, regs and pubs, and ATM.
   [1] PPC.
   [1] PPC and Weight and Balance.
   [1] Map interpretation.

UNIT QUIZZES (CONTINUED)

5. Which of the units, if any, covered too little material?

[8] blank
[9] None.
[1] N/A.
[1] Emergency procedures.
[1] Normal procedures.
[1] -10.
[1] PPC and Weight and Balance.
[1] Never provide areas where answers are out of limits.
[1] Weight and Balance.
[1] Night vision.

6. How would you compare this self-paced training structure to lecture presentation?

[1] blank
[2] not as good as lecture presentation
[1] not as good as lecture presentation - can't ask a question
[4] as good as lecture presentation
[15] better than lecture presentation
[1] better than lecture presentation - best

7. Use the following space to make any additional comments on the unit quizzes.

[16] blank
[1] None.
[1] Super.
[2] Too many "which is not true" type questions.
[1] Need a chart for a student to plot progress as tests are completed. Continually state reward of student management of time vs. being behind grade level. Gives positive reward for hard work. Start at 9:00 etc. Charge via Mr. Wick if below grade.
[1] Too many questions are too wordy. Example: "Which of the following statements if false?" followed by half a page of answers. This type of question is especially bad in pretests and posttests.

UNIT QUIZZES (CONTINUED)

(Question 7 continued)

7. Use the following space to make any additional comments on the unit quizzes.

[1] Prepare some programmed texts for the more difficult areas like PPC, night vision, and terrain flight that most older IRR were never exposed to before leaving the service.

[1] Would like to see less multiple choice, more fill blanks (one or two word answer).

[1] Again, if ample time and material had been provided prior to arrival, the training time needed could be reduced.

[1] Should have an instructor teach classes as well as the self-study program.

TRAINING FILMS

1. Did the training films help prepare you for the oral portion of the Phase I checkride?

   [7] not at all
   [15] some
   [1] some - but only a little
   [1] adequately
   [0] more than adequately

2. For which topics, if any, would you add a training film?

   [12] blank
   [4] None.
   [2] N/A
   [1] Emergency procedures.
   [1] PPC planning.
   [1] Actual dual checkride VTR.
   [1] Start-up procedures.
   [1] Update all MITAC films.
   [1] Maps.

3. Which of the training films, if any, would you delete from the training program?

   [8] blank
   [7] None.
   [2] N/A
   [1] All.
   [2] MITAC.
   [1] Make list available to students.
   [3] Preflight.

4. Use the following space to make any additional comments on the training films.

   [18] blank
   [1] Adequate.
   [1] The simulator and IP are by far superior to the films.
   [1] The two VTRs on preflight were up to date - good. Planned first of training - good.
   [1] We only saw the preflight film. It didn't do that much to reinforce what I was already learning from my IP.
   [1] In preflight film, pilot never did point out which items he was preflighting and, in most cases, as the narrator was explaining the procedure, the pilot just "ran" his hand over and around the subject area.
   [1] I would include as many films as possible.

MITAC TRAINING MATERIALS

1. Did the MITAC training materials help prepare you for NOE navigation?

   [9] not at all
   [13] some
   [1] adequately
   [1] more than adequately

2. Use the following space to make any additional comments on the MITAC training materials.

   [9] blank
   [1] Film's in poor condition.
   [1] MITAC takes too long - not for experienced aviators but <u>good</u> for first time.
   [1] Visual bad - boring, not realistic from different part of country.
   [1] MITAC films were not helpful. Film old.
   [1] Looks nothing like the real thing.
   [1] 90° field of vision in inadequate for NOE training on the films. The map test was in too much detail.
   [1] The equipment <u>must</u> be operational as the whole MITAC program is useful. I saw several problems with the equipment and materials that made them useless. Several films would not advance and keep up with the tape.
   [1] MITAC films need updating and/or repair to adjust narration with film.
   [1] Poor contrast; restricted viewing angle.
   [1] Need a study guide for NOE flight. MITAC films are ineffective.
   [1] It's too long.
   [1] All MITAC films need to be updated.
   [1] Not realistic.
   [1] Delete MITAC - useless.
   [1] Yeccch.
   [1] I had a pretty good background long ago.

FLIGHT TRAINING

1. Do you feel that the flight training prepared you for your Phase I checkride?

   [0] not at all
   [0] some
   [4] adequately
   [20] more than adequately

2. Did the Phase II flight training prepare you for the Phase II checkride?

   [1] received no training
   [2] received no training - passed on initial checkride
   [0] not at all
   [1] some
   [7] adequately
   [13] more than adequately

3. Did the night training using the light attenuating filters prepare you for your night checkride?

   [22] received no training
   [1] not at all
   [1] some
   [1] adequately
   [1] more than adequately

4. If provided a choice, would you have rather <u>trained</u> at night or with the filters? Why?

   [22] N/A
   [1] Filters - more convenient.
   [1] Both ways. I think the LAFs are good, but will not replace real thing.

5. What things, if any, would you change in the night flight training?

   [24] N/A

6. Please use the following space to make any additional comments on the flight training.

   [15] blank
   [2] N/A
   [1] More instruments.

FLIGHT TRAINING (CONTINUED)

(Question 6 continued)

6. Please use the following space to make any additional comments on the flight training.

[1] Excellent.
[1] Very good.
[1] Changes on checkrides was a killer.
[1] Students should be encouraged (or pushed) to complete Phase I as early into the second week as possible so that Phase II, night flight or LAF, and other additional training can be completed sooner or, to some degree, at least experienced.
[1] Additional actual flight time in instrument conditions for recovery from inadvertent IMC.
[1] Personally, would have like more flight.

2C35 AND SFTS TRAINING

1. Did training in the 2C35 help prepare you for your Phase I checkride?

[1] not at all
[20] some
[1] some - especially emergency procedures
[11] quite a bit
[1] quite a bit - need more

2. Did training in the SFTS help prepare you for your checkride?

[1] not at all
[11] some
[1] some - especially emergency procedures
[11] quite a bit

3. How much 2C35 training would you recommend for this program?

[1] 0 hours, 0 sessions
[5] 1 hour, 1 session
[1] 1 hour, 3 sessions
[1] 2 hours, __ sessions
[3] 2 hours, 1 session
[4] 2 hours, 2 sessions
[1] 3 hours, 1 session
[1] 3 hours, 2 sessions
[1] 3 hours, 3 sessions
[3] 4 hours, 2 sessions
[1] 4 hours, 4 sessions
[1] 5 hours, 5 sessions
[1] 6 hours, 3 sessions

4. How many hours and sessions of SFTS training would your recommend for this program?

[1] __ hours, 1 session
[1] 1 hour, 1 session
[1] 1 hour, 3 sessions
[2] 2 hours, 2 sessions
[2] 2 hours, 2 sessions
[1] 2 hours, 4 sessions
[1] 3 hours, 1 or 2 sessions
[3] 3 hours, 2 sessions
[2] 4 hours, 2 sessions
[1] 4 hours, 4 sessions
[1] 4.5 hours, 3 sessions
[1] 5 hours, 3 sessions
[2] 6 hours, 2 sessions
[2] 6 hours, 3 sessions
[1] 6 hours, 4 sessions
[1] 8-10 hours, 5 sessions
[1] 10 hours, 10 sessions

2C35 AND SFTS TRAINING (CONTINUED)

5. Please use the following space to make any additional comments on the 2C35 and SFTS training.

[16] blank
[1] None.
[1] The SFTS is a wonderful training tool and was under-utilized.
[1] Increase.
[1] More of both.
[1] 2C35 should not be given on the first flying day. With pretest and initial checkride, the day b[illegible]es too long to add 2C35. Stress factors too high during the normal training day and adding 2C35 training that night eliminates the good that the training could provide.
[1] SFTS - need three or four periods - very good device.
[1] Instructor Thomas very sharp, knowledgeable individual.

TOTAL PROGRAM

1. Upon completing this program, how proficient are you at flying?

[0] much less proficient than when you finished flight school
[0] less proficient than when you finished flight school
[2] as proficient as when you finished flight school
[10] more proficient than when you finished flight school
[12] much more proficient than when you finished flight school

2. What changes would you make in this program?

[6] blank
[1] None.
[1] None at the moment.
[1] N/A
[1] Extend.
[1] More instruments.
[1] More of it - make it annual - add instruments.
[1] Add more instrument training.
[1] More night NOE training and night vision goggles.
[1] More night flying periods.
[1] Require IPs to have basic ground rules as to fundamentals of instruction to be used - to date methods - positive motivation should be #1.
[1] More morning flights - students more alert.
[1] Do not involve DES in the checkrides.
[1] Shorten the work hours - one way to do this is to eliminate the many hours needed to look up reference materials for study guide. If the item is important, make the statement and reference the source.
[1] Eliminate the long afternoon study time - day begins too early to sit and read in a small classroom.
[1] Reduce physical and mental stress. Students are chronically fatigued.
[1] Maybe shorten the second year to a two-week program.
[1] Add the night orientation flight back into the program.
[1] Schedule shorter days during first week preferably.

3. How would you rate this program as a training program for reservists?

[1] blank
[0] poor
[1] fair
[4] adequate
[17] more than adequate
[1] more than adequate - only more than adequate because of quality of instructors. Program highly contingent upon quality of IPs.

TOTAL PROGRAM (CONTINUED)

4. Please use the following space to add any additional comments on the total training program.

[12] blank
[1] None.
[1] Thanks, I enjoyed it very much.
[1] An excellent, valuable program.
[1] This program is adequate for its intention, but the implementation must go into the field for further study outside the research environment.
[1] Good program; excellent instructors; but four people is too few - the program would be more effective if there were about at least 10 people training.
[1] This type of program is very effective and should be continued.
[1] Put a third training phase - to be night NOE/contact and night vision device (goggles).
[1] Put a third program together stressing night flight/night NOE.
[1] The program should be designed to take a reserve aviator from whatever level of competence he/she is to a Phase II completion with instruction that is designed to motivate positively to higher levels of proficiency. More specifically, this should be as basic as necessary to just a refresher as the situation dictates. The IP manual should be a required review for all IPs in a conference or discussion type atmosphere to ensure that the factors that positively motivate students are highlighted and negative factors are eliminated as much as possible. Understanding the need to stay within the guidelines of the program, there should be specified times that reservists are counselled as time goes by to ensure progress is made both from an IP gradeslip point of view, as well as a personal evaluation from the reservist. Positive motivation should be a key factor to ensure as much success as possible, and only as much negative motivation as is necessary to ensure safety as appropriate.
[1] The IRR/ARI program as I have seen and understand it is the most valuable management tool available to the reserve system to date. The program must be challenged to maintain the utmost in professionalism, safety standards, and accuracy. This can be accomplished by continually sampling IP MOI and actions. Motivation vs. manipulation should be stressed. Instruction/IP selection is more critical for this program due to things learned and unlearned due to civilian life. The better a person involved in this program is being a practical psychologist, the more learning will be accomplished in a short amount of time.
[1] MITAC - insert in film an RMI heading indication coordinated to aircraft headings. The PPC study guide was very helpful.

TOTAL PROGRAM (CONTINUED)

[1] Leadership and direction not adequate in that chain of command. Never even said hello or thank you. Purpose of project lost in daily grind. Student progress from day one lost in race to qualify--seldom brought up how much student has achieved, but always how much more is needed to attain checkride status.